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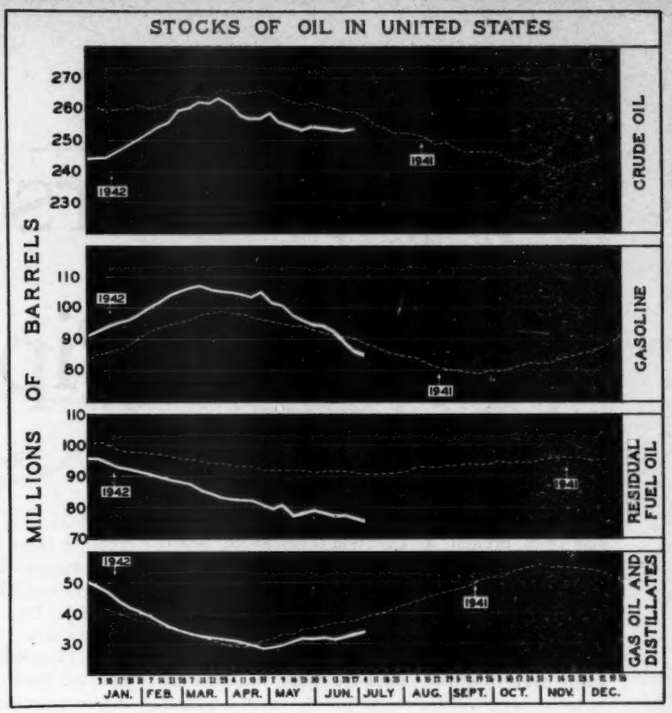
Trends

Refiners to Expand Crude Runs to Stills In July and August



IT will be necessary for refiners in practically all areas to expand their operations during July and August if they are to supply the assured demands for that period. Refiners as a group started reducing their crude runs to stills early in the year and in April dropped below the operating level of the same period last year. Over the past month it has been apparent that higher operating levels would be necessary at many small and large plants.

CRUDE PRODUCTION *3,319,125 bbl. daily average—down 424,065 bbl. One year ago 3,648,720 bbl.*

CRUDE STOCKS *253,364,000 bbl. as of June 27—up 616,000 bbl. One year ago 259,399,000 bbl.*

GASOLINE STOCKS *87,014,000 bbl. as of July 4 — down 1,382,000 bbl.* One year ago 88,709,000 bbl.*

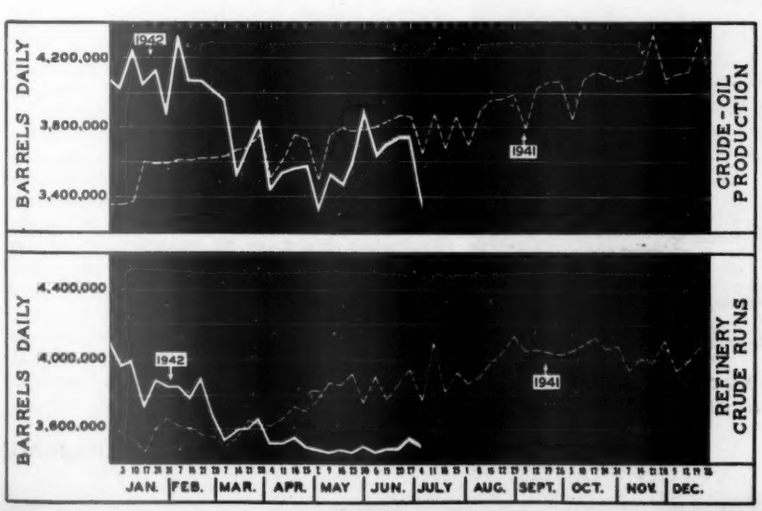
RESIDUAL FUEL-OIL STOCKS *76,903,000 bbl. as of July 4 — down 401,000 bbl. One year ago 90,935,000 bbl.*

GAS OIL AND DISTILLATES *33,520,000 bbl. as of July 4—up 669,000 bbl. One year ago 39,008,000 bbl.*

REFINERY RUNS *3,551,000 bbl. daily week ended July 4 — down 30,000 bbl. One year ago 3,766,000 bbl.*

*June 27 stocks revised to 88,396,000 bbl.

The solution to this problem of providing more crude oil at plants where it is needed, under existing transportation conditions, is not easy. At the request of OPC some of the pipe-line operators in the Middle West and Mid-Continent areas are attempting to aid the smaller refineries with additional crude. Deliveries are difficult to work out because of the limited pipe-line connections plus the fact that pipe lines generally in those areas are operating at capacity in supplying crude oil to plants which are aiding in relieving the eastern shortage. Tank cars are not readily available for the delivery of crude from the fields to the refineries. This situation emphasizes the necessity of expediting the completion of the several-point pipe-line program, final approval for which looking to the start of actual construction was given this week. Some observers predict that until part or all of this program is completed, it will be impossible to deliver at the proper points the required production of all oils totaling 3,842,700 bbl. daily which has been authorized by OPC for this month. Further expansion in tank-car deliveries to the eastern states has been promised.



DAILY AVERAGE PRODUCTION FOR WEEK

	July 4 crude oil	July OPC quota all oils	June 27 crude oil
Arkansas	74,100	78,500	73,700
California	624,250	739,500	642,250
Colorado	6,650	7,700	6,700
Eastern fields	98,475	112,500	97,925
Illinois	277,525	304,100	277,040
Indiana	18,675	22,000	20,325
Kansas	260,100	283,200	272,100
Louisiana	309,600	319,600	310,700
North Louisiana	*91,350*	.....	*90,700*
Louisiana Gulf Coast	*218,250*	.....	*220,000*
Michigan	66,150	64,800	65,700
Mississippi	83,950	49,900	83,500
Montana	23,240	23,100	23,160
Nebraska	3,775	4,100	3,775
New Mexico	80,560	89,500	80,480
Oklahoma	376,050	433,000	369,300
Texas	922,800	1,214,400	1,324,300
East Texas	*217,600*	.....	*295,000*
West Texas	*138,550*	.....	*234,450*
North Central Texas	*142,550*	.....	*149,400*
East Central Texas	*74,300*	.....	*94,050*
Texas Panhandle	*79,500*	.....	*107,000*
Texas Gulf Coast	*225,250*	.....	*378,850*
Southwest Texas	*45,050*	.....	*65,550*
Wyoming	93,225	96,800	92,235
Total United States	3,319,125	3,842,700	3,743,190
Total production, Jan. 1-July 4, 1942			699,710,370 bbl.
Same period last year			678,671,210 bbl.

The strong refinery demand applies to practically all products including gasoline. Motor-fuel stocks in several refining areas are lower than they were a year ago. Lend-lease shipments of motor fuels have been heavy and refiners selling in the agricultural areas are enjoying a surprisingly heavy demand. There is more forward buying of distillates and fuel oils in anticipation of requirements later in the year and this accounts for the fact that a large number of refiners at interior points would like to expand their plant operations over the next 60 days.

Part of the tightness in gasoline is of course due to the 20 per cent reduction in yields which most refiners have made effective at the request of OPC. It was assumed by many that when this reduction brought an increase in the production of other products, surpluses in distillates would develop. This has not been the case in any of the important refining centers, a situation which is due in part to the large overland shipments to the eastern states.

WPB Clears All Applications For OPC Pipe-Line Projects

By HENRY D. RALPH

WASHINGTON, D. C.—An administrative bottleneck which has been delaying formal approval of pipe-line relocation projects apparently has been broken, as the War Production Board has just cleared all applications for various parts of the program worked out jointly by the OPC and the oil companies.

The program was approved May 11 in OPC Recommendation 49, but little actual work has been done to date because of delay in obtaining priority approval for the relatively small amounts of new materials needed in connection with the relocation work. In addition to the approvals already obtained, many more details have been passed on by OPC and speedy action by WPB is now expected where new materials are involved.

The present status of the projects which are now actually under way is summarized by OPC as follows:

OPC Project 1

(Increasing crude-oil movement from Texas to Illinois and then east by 41,000 bbl. daily, of which 25,000 bbl. will be moved out of Illinois by pipe lines and 16,000 bbl. by lake tankers and rail.)

All project items have received ratings and work is under way at various points. Project is in three parts and includes following separate undertakings by companies listed:

Part 1.—The Texas Pipe Line Co.: Conversion and reversal of 8-in. crude-oil line from Port Arthur to Dallas, Tex.; installation of pump station at Waxahachie, Tex.; laying 110 miles of 10¾-in. and 8⅝-in. lines between Dallas and Stuart, Okla. Stanolind Pipe Line Co.: Laying 54 miles of 12-in. line between Graford, Tex., and Healdton, Okla.; installation of pump station at Devol, Okla.

Part 2.—Shell Pipe Line Co.: Construction of 10-in. crossing under South Canadian River between McClain and Cleveland counties, Oklahoma. Stanolind Pipe Line Co.: Replacement of river crossing (four lines) under North Canadian River in Pottawatomie County, Oklahoma; construction of river crossing under Missouri River. Ajax Pipe Line Co.: Laying 10 miles of 10-in. loop lines in Missouri. Texas-Empire Pipe Line Co.: Installation of pumps and replacement of 11 miles of pipe on Valley Center, Kans., line; installation of pump stations at Hiattville and Eureka, Kans.; installation of pump station at Ventralia, Mo.; laying 32 miles of 12-in. line in Illinois. Stanolind Pipe Line Co.: Installation of superchargers to increase pumping capacity between Kansas and Illinois.

Part 3.—Buckeye Pipe Line Co.: Installation of pumps at Ellsworth, Mount Cory and Warren, Ohio. Illinois Pipe Line Co.: Laying 152 miles of 8-in. line across Ohio. Tuscarora Oil Co.: Conversion and reversal of gasoline pipe line across Pennsylvania between Negley, Ohio, and Bayway, N. J. (The reversal has been accomplished already and the line will be converted to crude-oil service as rapidly as possible.) Southern Pipe Line Co.: Installation of pump stations at York, Pa., and Hancock, Md.

OPC Project 2

(Increasing products movement through Plantation Pipe Line between Baton Rouge and Greensboro, N. C., by 30,000 bbl. daily.)

Project rating obtained for installation of 14 intermediate pumping stations between Baton Rouge and Greensboro on Plantation line. Application expected to be submitted in few days covering construction of 212 miles of 10¾-in. and 80 miles of 8-in. reclaimed pipe line from Beaumont, Tex., to Baton Rouge to supply approximately 60,000 bbl. of products daily to Plantation line.

OPC Project 3

(Increasing pipe-line delivery of products to East by 15,000 bbl. daily.)

Shell Oil Co. has obtained project rating for pump station at Muncie, Ind. Filing of project application for products pipe line from Fostoria to Akron, Ohio. Depends on future developments in connection with studies of alternative methods of moving products eastward. Project rating obtained for reversal of Susquehanna pipe line between Cleveland, Ohio, and Twin Oaks, Pa.

OPC Project 4

(Increasing products pipe-line capacity in East by 32,000 bbl. daily.)

Sinclair Refining Co. has obtained project rating for completion of products line between Marcus Hook, Pa., and Steubenville, Ohio. Line as originally planned by company was to have moved products westward, but will move 12,000 bbl. of products a day received by barges and rail to East instead. Keystone Pipe Line Co. has completed reversal and conversion of present products line between Pittsburgh and Philadelphia and is delivering 20,000 bbl. of crude daily now.

OPC Project 5

(Increasing pipe-line delivery of products to Mississippi River at Helena, Ark., by 55,000 bbl. daily, for shipment up the Mississippi and Ohio rivers by barge to Pittsburgh.)

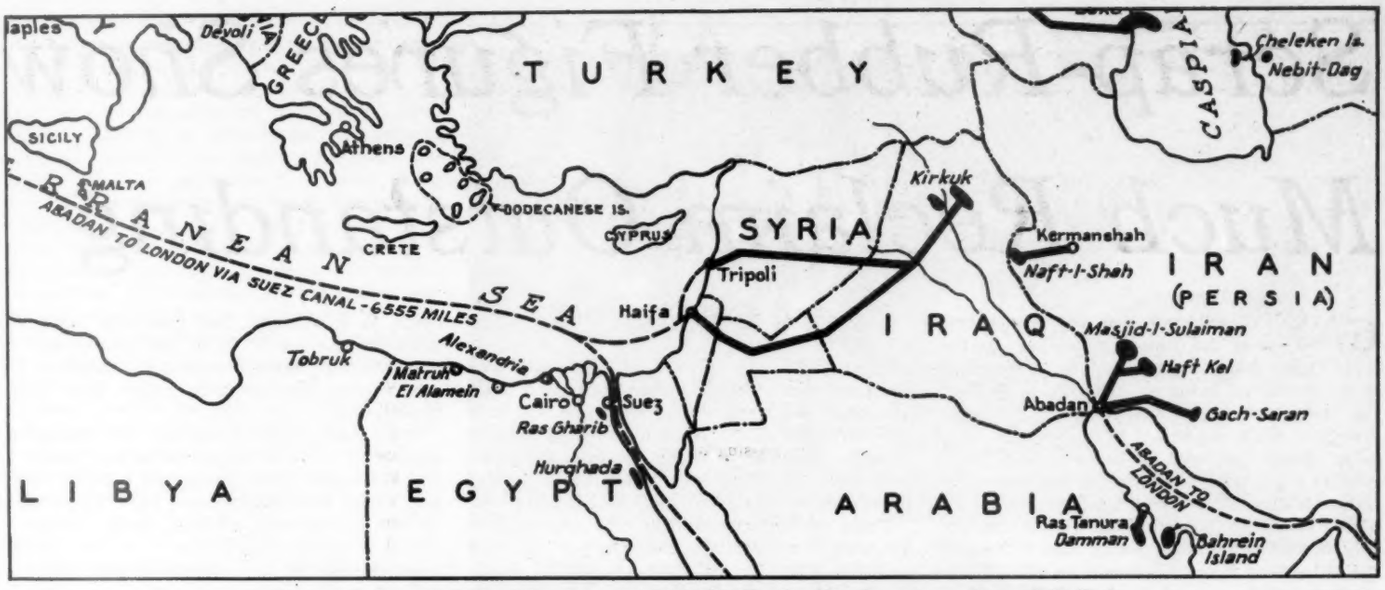
OPC has approved project application of Gulf Refining Co. for reversal and conversion of present crude line to transport products from Port Arthur, Tex., to El Dorado, Ark. Applications expected soon from: Texas Pipe Line Co. for construction of 15-mile extension of its system from Bossier to Benton, La., to connect with Magnolia pipe-line system at Benton Junction, La., using 8-in. pipe reclaimed from existing lines, and for reversal of Magnolia crude line between Benton Junction and El Dorado; and Project Five Pipe Line Co. for construction of 158-mile products line from El Dorado to Helena, using 10¾-in. pipe reclaimed from existing lines. Project rating obtained for Humble Pipe Line Co. covering installation of complete pump stations at Alanreed and Rule, Tex., in order to handle crude now moving through Gulf-Magnolia line from Panhandle to Ranger, Tex., which is being taken up.

Pipe reconditioning operations, as shown under way here at a yard in the Mid-Continent, will expand materially over the next few months as companies proceed with projects approved this week in Washington

Toluene Manufacturers Exempt From Antitrust Law

WASHINGTON, D. C.—Formal exemption from the effects of the federal antitrust laws has been given by Donald M. Nelson, chairman of the War Production Board, to all manufacturers of synthetic nitrogen-grade toluene for a plan under which they will exchange technical information regarding its manufacture.

The exemption was given in a notice to the attorney general under the terms of a recent act of Congress providing exemption for activities found by the WPB to be essential.



Comparatively small fields of Egypt are approximately 300 miles from the eastern extreme of the Nazi African drive. Iraq, Iranian, Bahrein and Arabian fields are 600 to 1,000 miles beyond El Alamein

Major Oil Fields of Near East Long Way From Nazi Forces

By J. P. O'DONNELL

At El Alamein, the most eastern point reached by the Axis drive along the southern coastline of the Mediterranean, the Nazi forces were still 600 to 1,000 miles from the important Kirkuk field in Iraq, the Iranian producing and refining centers and other Persian Gulf reserves. Loss of the Suez would cause serious interference with the supply line between Persian Gulf refineries and the United Nations' armies but would not be a mortal blow.

NEW YORK.—The spectacular drive of Marshal Erwin Rommel's Afrika Korps, pushing the British Eighth Army out of Libya and nearly half way across Egypt marked the war's closest approach of Axis forces to the prolific Near Eastern oil fields. It is generally conceded that the Persian Gulf fields are a primary objective of the German campaign in the eastern Mediterranean but in spite of Marshal Rommel's successes they are an objective that is still distant. Not only do the British Ninth and Tenth armies remain between Rommel's forces and the oil area extending from Iraq's Kirkuk field to Bahrein Island but great distances intervene.

When the British stopped the Axis drive at El Alamein it was still far short of capturing any oil objectives of critical strategic value. El Alamein is 210 miles from Suez, Egypt's only refining center, and 280 miles from the Ras Ghareb field, principal source of Egyptian crude oil. These and Haifa, Palestine, site of the Consolidated Oil Refineries, Ltd., new refinery are the only oil objectives that could be seriously regarded as being threatened by the Axis advance. Haifa is 180 air miles northeast of Port Said.

The Egyptian fields, of which Ras Ghareb is outstanding, have a daily average production of some 20,000 bbl. and are enough to make the country more than self-sufficient under normal circumstances. Ras Ghareb, discovered in 1938, is about 125 miles south of Suez. Its production is delivered by submerged lines to tankers which transport it up the Gulf of Suez to the city of that name for refining. Both Ras Ghareb and the principal Suez refinery are properties of Anglo-Egyptian Oilfields, Ltd., a Royal Dutch-Shell subsidiary. American oil companies including Standard Oil Co. (New Jersey), Socony-Vacuum Oil Co., Inc., Texas Co., and Standard Oil Co. of California are interested in Egypt and have prospected for oil in the eastern and northeastern area, particularly along the western shores of the Red Sea.

If the British lose all of Egypt now or in the future the loss of its crude-oil production and the refineries at Suez and Haifa would not represent in itself a fatal blow. Depending on their ability to transport it, more oil than the combined British armies in the Near East can consume is available from Anglo-Iranian's refinery at Abadan, Iran, or Bahrein Petroleum Co.'s refinery on Bahrein Island, 3,250 miles and 3,050 miles, respectively, by tanker from Suez. It can be safely assumed that the retiring British would wreck Egyptian oil properties as they did in Burma and that they would be valueless to the Germans. Even if the Haifa refinery was abandoned intact it would be of questionable value to the Axis since it is dependent on Kirkuk crude, delivered through an exposed line more than 600 miles long.

If Axis armies conquered Egypt entirely and were poised on its eastern border for a campaign in western Asia, great distances would remain before any major oil objectives were reached. The Kirkuk field would be the first logical goal and it is approximately 625 miles from Egypt. Next would probably be the Naft Kaneh and Naft-i-Shah area with its refineries in eastern Iraq and western Iran, approximately 650 miles from Egypt. Iran's most important fields, Haft-Kel and Masjid-i-Sulaiman, would be 850 miles away. The importance of these fields is due to the fact that they are the principal sources of supply for the Abadan refinery which has a capacity of more than 300,000 bbl. per day and is one of the world's largest. Saudi Arabia's Damman field and the Ras Tanura refinery of California-Arabian Standard Oil Co. would be almost 1,000 miles away and Bahrein Island with its field and refinery would be even more than 1,000 miles away.

While these facts show that the threat to the Near East fields is not immediate, nevertheless, Rommel's drive into Egype constitutes the most serious threat of the present war to that area. The Near East is an area which the United Nations could ill afford to lose. With the Japs having overrun the Netherlands East Indies and Burma it is the only remaining source of oil in Asia for the United Nations with the exception of the small and inaccessible Attock field in northwestern India. Loss of the Near East would make it necessary to supply all United Nations' requirements for oil outside of Russia, from the Western Hemisphere. In view of the tight tanker situation that has resulted in oil rationing in all parts of the world which are not self-sufficient, this could easily have an extremely important bearing on the final outcome of the war.

Scrap-Rubber Figures Show Much Reclaim Outstanding

By H. STANLEY NORMAN

CONVINCING evidence that the scrap-rubber resources of the United States are substantially higher than 1,000,000 tons was in the hands of the petroleum industry early this week when the 24-day collection drive neared its conclusion.

Only a small percentage of the nation's total scrap rubber, conceded to be in a fairly static ratio to population, was attracted into usable and countable channels by the brief drive. Momentum of the campaign, however, will extend considerably beyond the official closing date of July 10, indicating that a complete report on the collected tonnage will be delayed for a week or longer.

The total 334,000 tons of scrap rubber collected as of July 3, when a full week remained before the extended period expires, was an increase of 52 per cent over the tonnage reported for the first week. Some of the most impressive gains were reported from the highly populated sections of the country where more time was required for organization and necessary for direct appeals to the public.

Despite the relatively higher rates of collection reported by some of the eastern states during the second week of the collection drive, Middle West and Pacific Coast states held their national leadership. Final results may bring eastern states to positions more in keeping with their populations.

Meanwhile, petroleum-industry leaders attempted to interpret indicated results of the scrap-rubber drive in terms of motor-fuel rationing and in potential retreads and recaps for tires of automobile owners in areas where consumption is already curtailed. There were no clean-cut conclusions apparent from the incomplete reports available early this week. Purely aside from the hope that sufficient rubber could be collected to avert or delay spread of rationing, however, the petroleum industry found justifiable pride in having made another substantial contribution to the war.

There were no claims made that more than 40 per cent of the available scrap rubber had been collected even in the most responsive states. Mostly, the percentages of success were reported in much smaller figures. Realization that substantial amounts of scrap rubber remain in the hands of industry and the general public caused a last-minute redoubling of efforts in practically all states, but particularly in the oil country.

General view of the piles of scrap rubber at the reclaim division of the B. F. Goodrich Co., Akron, Ohio, which, along with other similar reserves, were being augmented this week by at least 334,000 tons collected largely through efforts of the oil industry

The large stake of the oil industry in successful prosecution of the scrap-rubber drive is obvious. Leaders of the industry, however, pushed the campaign to the absolute limit of their capabilities with the full knowledge that anything short of quota excesses would net little, if any, rubber for nonessential civilian use. Consequently, chairmen and oil-company workers in the drive pointed out, the industry could not be accused of viewing the campaign from a selfish aspect.

One of the inescapable conclusions drawn from the scrap-collection drive, with all the obstacles of hasty and incomplete organization, was that reclaimable rubber in the hands of the public is somewhere in excess of 15 lb. per person. Oklahoma, as an example, had practically assured a collection average of 15 lb. per person and, at that, campaign leaders realized that some of the rubber scrap had not been turned over to the Government.

If all sections of the country had attained an average of 15 lb. of scrap rubber per person as was registered a few places, the national collection would total 982,500 short tons. The total of 334,000 tons reported collected during the first 2 weeks is slightly more than 5 lb. per person. Some officials of the rubber-collection campaign considered the preliminary results gratifying in view of the almost complete lack of incentive, other than patriotism. The price of 1 cent per pound for scrap rubber was, in the opinion of most officials of the program, too infinitesimal to be a factor.

There have been three chief plans advanced for the collection of scrap rubber. They are: (1) Patriotic appeal with virtually no monetary incentive (the method now drawing to a close; (2) a sufficient price to attract the commercial stocks, and (3) a replacement incentive, extending purchase-certificate privileges to contributors, if, as and when national supplies exceed military requirements.

It may be assumed, observers contend, that most of the patriotic scrap rubber was reached by the 24-day campaign now being concluded but individuals in neither of the other two classifications were particularly impressed, the results indicate.

Leaders of the voluntary scrap-rubber drive, ranging from Coordinator Ickes and W. R. Boyd, Jr., chairman of the Petroleum Industry War Council, down through the district, state, county, and community chairmen, this week appealed for a final exertion from the industry to close the drive with a rush.

In a direct appeal to the mayors of the principal cities throughout the country, Coordinator Ickes sent the following telegram late last week:

"Results of the reclaimable-rubber collections to date," he wired, "indicate that the public generally does not appreciate urgency of the campaign. I earnestly request that you reemphasize to all in your community that the rubber which we fail to collect in this campaign might be the rubber that would have made a raft to save the life of some American flier in the Pacific, or which might have gone into the tires of a plane to bomb the enemy.

"Collections so far have not been sufficient to eliminate the necessity of rubber-conservation measures which we would like to avoid. In addition to appeals to the public, you can help greatly by initiating collections by your city government. Federal agencies are doing this at the suggestion of the president and I have asked governors of all states to initiate similar contributions in the form of worn tires and tubes, rubber stamps, discarded hose, seat pads, and all other rubber articles which can properly be spared for critical military needs. Every effort is needed to insure success during the current 10-day extension authorized by the president."

Reference to the "rubber-conservation" meas-

ures which we would like to avoid" unquestionably applied to gasoline rationing. The coordinator's emphasis on this point is keyed to his realization that further curtailment in the demand for domestic petroleum products will hamper the industry in maintaining an adequate supply of materials. The industry has made numerous sacrifices in converting its basic operations to war requirements. Some refiners are producing no more than 65 per cent of their normal yields of regular gasoline and hardly any are recovering more than 80 per cent of the domestic motor fuel separated from crude a year ago. Further dislocation of basic recoveries, technicians in the industry contend, will immobilize scores of refinery units now barely clinging to an operating status.

Evidence of the oil industry's willingness to make sacrifices in order to make the scrap-rubber drive a success is contained in negotiations between refiners and fruit growers in the Middle West and Pacific Coast. Refiners sought out owners of citrus-fruit orchards who had accumulated large stockpiles of automobile tires no longer suitable for highway service. Tires, normally, are burned by orchard owners to protect fruit and trees against frost and cold weather. Refiners worked out exchanges of fuel oil for the unused tires and turned the reclaimable rubber over to the Government without regard to difference in costs and, in effect, contributed the price of the burning oils so traded to the scrap-rubber drive. The record contains literally scores of other similar sacrifices.

Carloads of reclaimable rubber were moving this week from all parts of the country to the sorting warehouses and concentration points. Mr. Boyd, who as chairman of the PIWC directed the petroleum industry's part in the general program from Washington, D. C., headquarters, urged prompt shipments from bulk-oil terminals, the primary points of concentration.

"This rubber is too precious and too urgently needed by our forces to permit it to lie around in bulk plants for indefinite periods," said Mr. Boyd. "The oil industry naturally is anxious to do its utmost to clear out its bulk storage stations and the Government has cooperated magnificently. The Rubber Reserve Co. is to have this rubber shipped promptly to rubber-reclaiming plants and other points so that it can be processed quickly into rubber parts for military needs, or to whatever other uses the Government wishes to put it."

●

Government Coastal Reserve Proposed in Senate Bill

WASHINGTON, D. C.—A bill to create a government petroleum reserve along the Louisiana and Texas Gulf Coast and to withdraw such lands from exploitation has been introduced by Sen. Theodore G. Bilbo of Mississippi.

The bill (S. 2637) would not affect any lands owned by any state or any individual or corporation, but would apply from the low-water mark for a distance of 75 miles into the Gulf of Mexico from the mouth of the Mississippi River to the northeastern boundary of Calhoun County, Texas, a distance of some 700 miles.

In introducing the bill, Senator Bilbo said that the United States may be required to produce greatly increased quantities of oil before the present war is ended, and that the Government should take control of the under-water reserves not now exploited by the oil industry. He declared that for at least 10 miles out from the coast the water does not exceed 50 ft. in depth so that wells could be drilled there and capped until needed.

This drafted organization at the Petroleum Industry War Council headquarters in Washington plugged hard in the final stretch of the scrap-rubber drive. In the picture are those responsible for general publicity, bulletins and other functions in the campaign. Left to right: Frank Phillips, Standard Oil Co., New Jersey; W. R. Boyd, Jr., chairman of the PIWC; Joe Dwyer, assistant to the chairman; Jim Delaney, Cities Service Oil Co.; Ed Esmay, American Petroleum Institute and Don Marschner, Shell Oil Co., Inc.

This Week...

TRANSPORTATION.—OPC pipe-line projects finally receive ratings from WPB, unstopping a blockade of red tape. Project ratings issued covering new materials needed in revamping, relaying, reversing various systems, all for the single purpose of increasing eastern deliveries. . . . Tank-car shipments recede slightly from peak registered June 20, averaged 720,720 bbl. daily in last week reported. . . . A. N. Horne, formerly manager of Empire Pipe Line Co., more recently in the War College, released from Army service, made general superintendent of War Emergency Pipe Line, Inc. . . . Districts 1, 2 and 3 joint barge subcommittee propose stoppage of inland waterway oil movement from Louisiana to Texas. . . . Illinois Pipe Line Co., considering parallel line system from Lima to East Sparta, Ohio, a distance of 160 miles. Would increase capacity between points to 70,000 bbl. daily, present facilities can move 30,000. . . . Bids due middle of next week, at Washington, for construction contracts on War Emergency line. . . .

RUBBER.—Scrap collections totaled more than 334,000 tons as of July 3. Densely populated eastern states improve early results. Some sections of country collect average of 15 lb. of reclaimable rubber per person, national average stood at 5 lb. last Friday with a week of campaign remaining. . . . High averages in few states indicate total reclaim exceeds 1,000,000 tons. How to bring general average collections up to highest is next problem, if enforced rubber savings are to be avoided. . . . Scrap brought in by collection drive not entirely interpretable as new reserves. Because, scrap collections lagged behind normal in first 6 months. . . .

PRODUCTION.—Nation's output dips to 3,319,000 bbl., lowest since the "producers strike" of August and September, 1939. . . . Attention of industry focused on material-priority outlook, after July 31. Lower inventory of supplies appears to be Washington's chief objective. . . . Senate bill proposes creation of Government petroleum preserve along coastal waters, from Mississippi River mouth to Calhoun County, Texas. . . . Producers resent inclusion of other branches in War Petroleum Corp. bill. How or why bill was broadened to include all divisions isn't explained. . . .

RATIONING.—Eastern consumer rationing out of balance with basic wholesale restrictions. Metropolitan stations unable to satisfy gallonage to which motorists are entitled by rationing. Permanent plan, effective July 22, may correct situation. . . . Extension of rationing to western Ohio line considered. . . . Spread to other unrationed states uncertain. . . . Final results of scrap-rubber drive may decide issue. Eastern political blocs, certain Washington agencies still consider restrictions in Middle West as inevitable, continue formation of organization to enforce it. . . .

REFINING.—Synthetic-rubber authorities, at Washington, testify before congressional committee that original cost estimates on butadiene are at least adequate, possibly excessive. Plants coming into production providing more accurate data on costs. . . . Most refiners now making not more than 80 per cent of last year's yields of regular gasoline. Some coastal plants have reduced gasoline yields to 65 per cent of normal. Intensity of yield reductions grades to south where deepest cuts are found. . . .

Oil Industry Considers Several Supply-Control Alternatives

By H. STANLEY NORMAN

PERMANENT solution of the equipment-procurement problem continued this week as the No. 1 concern of all operating branches of the petroleum industry. Extension of Preference Rating Order P-98 last week delayed for a month the necessity for gearing equipment policies to any radical change in conditions. Indications were even stronger, however, that some drastic revisions are forthcoming in the equipment-control machinery of the War Production Board and the Office of Petroleum Coordinator.

The only pertinent alteration in the month extension of P-98 applies to equipment manufacturers. Class 1 producers (manufacturers), including all companies using more than $5,000 worth of critical metals in 3 months' operations are required, under revised terms of P-98, to use the symbols specified in the Production Requirements Plan in obtaining raw materials. The preference ratings of P-98 cannot now be extended by the producers of oil-field equipment, if the scope and nature of their business involves the use of $5,000 worth, or more, of critical metals during the third quarter.

Meanwhile, operating branches of the industry are discussing the various proposals that have been made for future control of materials. There are few, if any, who anticipate further extension of P-98 after the postponed deadline of July 31 expires. There are several possible routes that future petroleum-equipment control may follow.

Most Probable Plan

The plan oil men consider most probably will be adopted is patterned after the PRP for manufacturers and would be known as either the Maintenance Requirements Plan or Special Requirements Plan.

Tentative discussions of the MRP indicate that basic points in the PRP would be applied to the distribution of maintenance and repair materials. Consumers, which in the case of the petroleum industry would include producers, refiners, pipeline operators and marketers with their various subdivisions, would be required to estimate their equipment needs for periods of 3 months. In arriving at estimated requirements, operators would be compelled to report inventory in minute detail and probably deduct supplies on hand from the new materials for which preference certificate is sought. Forceful elements in the industry are making a strong fight for permission to retain a repair, maintenance and operating inventory to cover 90 days' requirements. Arguments are advanced that materials requirements in operations of the petroleum industry are unpredictable and that efficiency of war functions would be impaired.

Another approach to the equipment-control problem, although apparently aimed at the same ultimate objective, is the much-discussed plan of redistribution. Discussions have been held on the point of reducing the entire industry's equipment inventory to actual and immediate requirements. Some of the Washington agencies advocate what would amount to a virtual cessation of petroleum-equipment distribution until the material inventory was depleted. This plan would involve detailed inventory reports from all companies. Those concerns with more materials in stock than required for their immediate operations would be requested to pool the excess equipment, or make it available under some other scheme to companies which depend on supply-store purchases to meet their needs as they arise. Several suggestions have been advanced to implement the redistribution program. Some have proposed that excess inventories, if the main features are finally adopted, should be assigned back to the supply companies which, in turn, would become the media through which redistribution would be effected.

One of the most serious objections to the suggestion of redistribution is that companies have equipped their properties with particular types of equipment and their inventories are composed of similar new units and repair parts that would be useless to neighboring operators who may have standardized on completely unrelated equipment. In other instances, a company's inventory may be composed exclusively of material for one specific operation and its materials would be valueless in meeting the requirements of other properties within a reasonable radius.

Oil companies are adamant in their opposition to acting as the media for redistribution of equipment. The companies have no organization for conducting exchanges or sales of equipment and have taken the position that such an encroachment on the normal functions of suppliers is improper and unnecessary.

Extension of P-98 will allow time to complete an over-all materials program expecially adapted to the oil industry, OPC announced in conjunction with the WPB order. The subject will be one of the main points of discussion at the July meeting of the Petroleum Industry War Council called for July 14. W. F. Huff, former director of materials for OPC who is now an assistant deputy coordinator charged with composing the equipment program, may present a concrete prospectus at the PIWC meeting.

Amendment 2 to Preference Rating Order P-98, extending the effective date through July 31 and making certain revisions, reads as follows:

P-98 Extended and Amended

A. Sec. 1041.1 (Preference Rating Order P-98, extended and amended),

(*d*) (3) is hereby amended to read as follows:

(*d*) *Restrictions on use of ratings.*

3. Restrictions on suppliers. A supplier may extend a preference rating to the delivery of material only in conformity with the applicable provisions of Priorities Regulation 3, as amended from time to time.

B. (*e*) (1) is hereby amended to read as follows:

(*e*) *Application of preference ratings.*

1. Preference ratings assigned herein shall be applied or extended only in conformity with the applicable provisions of Priorities Regulation 3, as amended from time to time. A supplier, who is also a Class 1 producer, within the meaning of that term in Priorities Regulation 11, may not extend a preference rating except when permitted under the terms of provisions of such regulation.

C. (*m*) is hereby amended to read as follows:

(*m*) *Applicability of priorities regulations.* This order and all transactions affected hereby are subject to the applicable provisions of any priorities regulation issued by the director of industry operations, as amended from time to time.

D. (*n*) is hereby amended to read as follows:

(*n*) This order shall continue in effect through July 31, 1942, unless sooner revoked.

Special Gasoline Allotments To Be Closely Regulated

WASHINGTON, D. C.—The new coupon gasoline-rationing system is to be more stringent than the average car user realizes, the OPA warned eastern motorists this week.

"Thousands of motorists in the rationing area, who now hold some form of the 'B' or an 'X' card," Leon Henderson, OPA administrator, said, "are going to get along on a basic 'A' coupon book or less than 4 gal. per week."

The warning was issued by OPA because of the apparent impression gained by many motorists who read of the new plan, which goes into effect July 22, that there had been a liberalization in the amount of gasoline to be rationed under the new plan.

"The exact opposite is true," Mr. Henderson said. While the minimum coupon book will grant a fraction of a gallon more per week than the "A" card grants under the present temporary rationing, the conditions that must be met to obtain supplemental rations under the new plan are so strict that most auto owners will have to get along on the minimum. Two-thirds of eastern motorists now enjoy some form of extra allotment above the "A" card minimum.

Also acting to curtail the total gasoline consumption will be the mileage ceiling placed on the "B" book. The most gasoline that can be obtained with a "B" book, on the basis of the present 4-gal. value of the coupon, will be 64 gal. a quarter.

House Committee Commends OPC for War Activities

By HENRY D. RALPH

Improvements in refinery technique and facilities now permit yields of 30 bbl. of 100-octane gasoline per 100 bbl. of crude compared to a ratio of 3 to 100 before the OPC coordinating program was started.

This was one of the high points in Deputy Coordinator Davies' testimony before the House appropriations committee reviewed in this story. Others were:

The OPC staff is to be increased, from 661 now to 956, if funds are available.

So far in this war the Army has not lacked for a single barrel of oil. OPC personnel has no aspirations to build up a permanent organization.

WASHINGTON, D. C.—An appropriation of $3,365,000 to operate the Office of Petroleum Coordinator for the 1942-43 fiscal year is contained in first supplemental national defense appropriation bill for 1943 just passed by the House and pending in the Senate.

Heretofore, the OPC has been operating on an allotment from the president's emergency funds, and has spent $1,450,000 from the time of its formation, May 28, 1941, to date.

The bill carries a total of $1,830,000,000 for various war agencies, and although the House committee on appropriations cut the Office of Price Administration by $66,000,000 and other agencies to a total of $20,000,000 below estimates of the Bureau of the Budget, it made no change in the requests of the OPC. In reporting the bill, the committee said:

"The committee invites attention to the statement of Deputy Coordinator Ralph K. Davies. It is one of the most interesting and most satisfactory reports of accomplishment that has come to the committee in connection with the war agencies.

"Realizing the responsibility upon this industry for supplying adequately and on schedule the gasoline, fuel oils, and lubricants needed by the 185,000 airplanes, 120,000 tanks, 18,000,000 tons of shipping, and all the other requirements of our Army, Navy, lend-lease, and civilian needs, the amount granted to discharge the responsibilities of the coordinator's office is modest. Our armed forces so far have received sufficient supplies of petroleum products. They must continue to receive them and the coordinator's office should be adequately staffed to insure that they do."

Davies' Statement Praised

Mr. Davies' statement at the hearings, which was so highly praised by the appropriations committee, reviewed briefly the wartime problems facing the oil industry and the work of the OPC in solving these problems.

"In normal times," he said, "the oil industry is quite capable, without any assistance or direction from the Government, of making all manner of petroleum and petroleum products available when and where they are needed, in ample quantities. In wartime, when all of our resources must be utilized so as best to meet military requirements, some measure of centralized direction by the Government is not merely desirable, it is essential."

He told the committee that the task of meeting war demands with limited supplies of materials and under wartime price controls is an enormous task which has already caused a revolution in transportation and is now bringing forth a revolution in refining technology.

Using the 100-octane aviation gasoline program as an example, Mr. Davies said that the United States victory in the battle of Midway Island meant that the oil industry and the coordinator's office have succeeded in producing and delivering this fuel when and where needed.

Mr. Davies said that when the program of increasing 100-octane capacity was started last summer only about 40,000 bbl. daily was being produced and only a dozen companies even knew how to make it, but by coordinating the knowledge and facilities of the entire industry the production has been more than trebled.

"Gentlemen," he told the appropriations committee, "the results have been perfectly astonishing. A high Army officer confessed frankly that he considered them 'miraculous.' Although I cannot, in open sessions, give you figures on present or prospective production, I can tell you that well before Pearl Harbor we were shooting for 150,000 bbl. per day, and that our sights have been raised very considerably since then. I can tell you that our 100-octane production, from existing plants alone, is substantially 50 per cent more than the maximum which had been thought possible just a few months ago."

Questioned by the committee, he and Wright Gary, OPC director of refining, revealed that the processes have been so improved that the newer plants now yield 30 bbl. of 100-octane gasoline per 100 bbl. of crude as compared with 3 bbl. per 100 before the OPC program started. Contracts for the full supply over the next 5 years have an average price of a fraction over 12 cents per gallon, as compared to a previous cost to the Government of from 14.5 to 38 cents per gallon. Mr. Davies estimated that these prices will save the taxpayers some $25,000,000 per year, and Mr. Gary added that these prices represent profits to producers ranging from zero to 6 per cent on the investment, as compared with previous profits ranging from 30 to 35 per cent in the sale of 100-octane gasoline.

Asked whether these achievements could be attributed to the coordinator's office, Mr. Gary said:

"I think to the coordination of all technical endeavors of the industry as a whole; contributions were made by the industry to enable us to get that result."

It was revealed at the hearings that OPC asked for $4,191,000 to enable it to employ 1,174 people during the current fiscal year, but the Bureau of the Budget reduced this to $3,365,000 and 956 persons. At present OPC has a staff of 480 in Washington and 181 in its five field offices. With the funds carried in this bill it expects to increase this to 637 in Washington and 319 in the field, a total of 956.

Committee members appeared to be critical of the fact that the requested appropriation is considerably above expenditures during the past year, and also of the fact that an unusually high percentage of OPC employes are in the upper brackets of the government pay schedule. Mr. Davies and members of his staff explained that costs mounted continually during the past year and that expenditures are now at the rate of about $2,500,000 per year.

The high average pay was explained by the fact that the work of the OPC requires experts because it is chiefly a coordinating job, with detailed work done largely by the oil industry or other government departments. Mr. Davies declared that many staff men had virtually been drafted from the oil industry and their government salaries are much below what they could earn in private business.

"The type of personnel that we need," said Mr. Davies, "is the highly trained personnel that is useful in directing petroleum industry operations. We do not have to do a lot of detailed work ourselves, or carry on operations ourselves, but we do have to direct those operations, and the operations are carried on by the industry, by their forces; so that you have a larger directing personnel, a larger executive personnel, in this agency than you would have in the ordinary agency. It is a management job."

Chiefly a Coordinating Job

Mr. Davies paid high praise to the cooperation of the oil industry with the OPC. As an example he cited the critical fuel-oil shortage in New England last March, saying:

"We called an emergency conference of leaders of the oil industry in Washington. To them, as to us, it was plain that action had to be taken at once, not in a week, or even a few days, but right then.

"In the course of our discussion, our director of petroleum supply arrived at the meeting. He had been working on a plan and he brought it with him. He read it. It was a simple plan. It called for changing refinery yields—at once—to produce more heavy fuel oil and less gasoline. It called for going to big industries which had surplus heavy oil and asking them to give it back. It called for huge shipments by tank cars out of the Middle West, and for taking other large amounts out of the gulf. Practically everything in it meant extra expense, or outright loss, for the oil industry. He admitted all of that. He said merely: 'All that I will say for this plan is that it will get the heavy oil—and get it quickly.' The plan was adopted by the industry. It did get heavy oil—quickly. The New England crisis was overcome.

(Continued on Page 22)

STATE CAPITALS...

CALIFORNIA

THE LOS ANGELES CITY COUNCIL sidetracked the plan of J. E. Elliott and Shell Oil Co., Inc., to drill a deep test in the old Salt Lake field in the city limits but announced the matter would be given consideration at a later date. The council did, however, vote to incorporate the so-called Gilmore Island into the city of Los Angeles and this might indicate some favor to the proposed plan as this was a requirement to the granting of permission to drill. Action of the various councilmen during the past few weeks, however, indicates a desire to avoid voting on the measure with elections coming up.

Several councilmen are of the opinion that, if the Salt Lake section is opened, Ramsey Brothers should be granted permission to develop the Elysian Park area where authorization was denied a few years ago. The anticlinal structure at Elysian Park is a visible structure and the only thing remaining to be determined is whether it contains production. Several years ago the Los Angeles city council voted to permanently prevent any drilling within the corporate limits of metropolitan Los Angeles and for this reason the granting of permission to J. E. Elliott to drill in Gilmore Island would establish a precedent whereby similar development may be allowed at other sections in the city. Under proper control and necessary restrictions many believe drilling operations should be authorized especially during the present emergency.

SEVENTEEN POOLS have been added to the list exempted from restriction on oil production in the California allocation schedule for July submitted by the production committee for District 5 to the Office of Petroleum Coordinator for approval, making a total of 143 such pools.

These exemptions are based upon a new segregation of pools into those in which capacity production would not reduce ultimate recovery of oil from the pool, as against those in which wide-open operation would lower ultimate recovery, this determination having been made from a study and evaluation of production characteristics of the pools by the engineering subcommittee of the production committee.

Pools now are divided into six classes: Ia, b, and c, and IIa, b, and c. Pools in the "I" class are those in which capacity production would result in reduction of ultimate recovery, and those in the "II" class are those in which no damage to the pool would result from unrestricted output. The subdivisions in each class indicate gradations of effect of unrestricted production upon ultimate recovery, as well as progressive stages of depletion, relative average well size, and utilization of present equipment. For example, it would be more damaging to ultimate recovery to produce a Ia pool to capacity than it would to produce a Ic pool to capacity, and exemption of IIc and b pools utilizes present equipment where rate of availability is low while reserving for future emergencies the flowing production of the undepleted pools.

Basis for these classifications is the percentage of depletion of the pool. As depletion of the pool progresses, it grades from the "I" classification and its subclassifications into the "II" classifications and its subclassifications. Thus, a Ia pool is a relatively undepleted flowing pool, and a IIc pool is a marginal area, usually in the extreme stages of depletion with a producing capacity not materially in excess of the economic minimum necessary to maintain continuity of production, the other gradations falling between these two extremes.

With pools thus classified, the additional volume of producing capacity exempted from restriction in July as compared with June is estimated at 65,620 bbl. per day, resulting in a net increase of 11,434 bbl. per day in allotment. The total California production quota for July is 739,500 bbl. per day, including crude oil, natural gasoline, liquefied petroleum gases, and condensate. Out of this total, net crude requirements are estimated by the production committee to be 699,400 bbl., of which 3,320 bbl. per day is reserved for wells to be completed during July, leaving 698,080 bbl. allocated to producing wells as of the first of the month.

TEXAS

MORE EXACTING information will be required of Texas crude-oil purchasers in their monthly nominations of demand under terms of a new order covering procedure of filing and scope of data issued last week by the Railroad Commission.

All purchasers must file a sworn statement of "actual demand" on a calendar basis for the next succeeding month and an estimate for each succeeding 5 months. The form must be sworn and filed on or before July 10 and on or before the tenth day of each succeeding month thereafter.

Statements must be made by Railroad Commission districts and must contain the following information:

1. The number of the Railroad Commission district.
2. The name of the purchasing company and its address.
3. The name of each field in the district from which the reporting company desires to purchase crude oil, the county in which such field is located and the purchasing company's demand for crude oil from each such field for each calendar day during the next succeeding month and its estimated demand for crude oil from each such field for each calendar day during the next succeeding 5 months thereafter. Each field shall be reported under the same name and in the same manner as it is carried on the Railroad Commission schedule of allowables.
4. In the event the reporting company is not the original gatherer, it shall show the persons or companies from whom the crude oil will be received, the amount to be received from each and the field in which the oil to be purchased will be produced.
5. The persons or companies to whom the crude oil is to be delivered and the amount to be delivered to each.

"The above report," declares instructions from the commission, "shall be made in the form and manner prescribed in Form C-1, and shall contain all other data and information required by this form."

THE REGULAR MONTHLY proration hearing at which demand and allowables for August will be considered by the Railroad Commission has been called at Austin July 20.

Bureau of Mines Internal Organization Revamped

WASHINGTON, D. C.—Streamlining of the Bureau of Mines by reorganization of its essential operating structure, in order to speed the expanded program of providing strategic and critical minerals for the nation's war needs, was announced last week by Dr. R. R. Sayers, director of the bureau.

Under the reorganization order signed by Secretary Ickes, three regional offices are being established by the Bureau of Mines, which will operate under the supervision of Dr. R. S. Dean, assistant director, who is in over-all charge of the work of the Bureau of Mines.

The regional offices will be located at Salt Lake City, Utah, for the western states; at Rolla, Mo., for the central states; and at College Park, Md., for the eastern and southern states. Each office will be headed by a regional engineer and an assistant regional engineer, whose functions will be to supervise, initiate and execute investigations approved by the office of the director leading to the more rapid use of mineral resources in the region under their supervision. The regional engineers will supervise the operation of the experiment stations in their respective regions and will direct laboratory investigations, as well as prepare such analyses and reports as will speed the production of minerals needed for the war.

The regional engineers, under the terms of Secretary Ickes' order, will take over all the functions and duties in the field previously assigned to the mining, metallurgical and nonmetals divisions of the technologic branch which are now abolished. To advise the office of the director and to perform fact-finding functions and handle reports from the regional engineers, a Resources and Laboratories Service, containing a Mineral Processes Division, a Mining Division and a Laboratories Planning Division, has been established with a small staff in Washington.

The reorganization order signed by Secretary Ickes also provides for the establishment of a fuel and explosives service within the bureau, which will take over the Coal Division, the Petroleum and Natural Gas Division, and the Explosives Division, all of which were part of the abolished technologic branch. The operation of the helium plant at Amarillo will be under the jurisdiction of the Petroleum and Natural Gas Division, as formerly. All laboratories working exclusively on petroleum or exclusively on coal will also operate under the Chief of Fuels and Explosives Service, as will sections of other laboratories devoted to petroleum, gas or coal.

the OIL AND GAS JOURNAL

PRODUCING REFINING NATURAL GASOLINE PIPE LINE

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Effective Manpower

This comment has to do with whether or not key men in the oil industry should stay on their jobs as civilians or accept military service when it is offered them directly or through the Selective Service Act.

The easy answer for management and employe when military service is proffered is to accept. But recent developments raise the question as to whether this is always the patriotic answer.

It is no secret that the shortage of competent manpower is the most serious problem now confronting those who will build and operate the petroleum industry's three-quarter-billion-dollar synthetic-rubber division. The same situation applies to the quarter-billion-dollar aviation-gasoline program and the several pipe-line projects which must be completed within a few months.

It is not generally realized in this connection, that what this industry is being asked to do, in many respects, dwarfs the war efforts of other industrial enterprises.

The automotive industry stopped its car production when it began the manufacture of airplanes, tanks, and other military equipment. Similar conditions apply to many other manufacturing activities now engaged in the production of war goods. In these operations, labor and management are readily shifted to the new job.

But petroleum's crude-producing, transportation, and refining activities are still at 85 per cent of the operating level at the time of Pearl Harbor. The production of rubber, 100-octane gasoline, explosives and other war materials, which constitute a mammoth enterprise, is being superimposed on normal essential operations.

Furthermore the oil industry's job is not one of simply expanding production or making minor changes in existing manufacturing methods. Entirely new arts are involved in making rubber. Design and construction start in the chemical laboratories and will end when a new operation that has never been carried on before on a large-scale basis does what it is supposed to do.

Who is going to do all this? Builders and operators of the new processes can't draw on other industries for key personnel. There is no time for training courses. In this work women can't replace men.

The only place to go to get competent administration and the required skills is to the petroleum industry itself. The new manufacturing arts are more closely allied to established refinery practice than they are to anything else. Men already in the industry must take over the big part of the construction burden or the job of fueling airplanes and war industries and assuring adequate rubber supplies will not be completed.

This publication has no hesitancy in urging those, specially qualified, who can contribute to the war-production tasks under way and ahead for this industry to stay in civilian life until this all-important work is completed. We know this represents the viewpoint of the highest government officials who are directing the distribution of manpower. They have gone so far as to suggest that superintendents, foremen, engineers, chemists and other trained men, already in military service, be returned to civilian life for a time if they can expedite the completion of petroleum's war activities.

While petroleum's manufacturing and transportation operations are receiving first consideration now, there can be no prolonged letup in any other phase of its activities. The recent Axis victories in the Near East may lead to the destruction of important oil resources in that area, leaving no supplies to the United Nations in the Eastern Hemisphere except those of the U.S.S.R. which are a summer objective of the enemy.

All this emphasizes more and more that petroleum in this hemisphere has become the industrial front line of this nation and its allies. It must have the manpower to do what it has to do quickly.

Asphalt and Road-Oil Use in Three Districts Prohibited

WASHINGTON, D. C.—Use of asphalt, tar or road oils for any type of paving work is prohibited for the duration in Districts 1, 2 and 3 by Revised Recommendation 45 issued Tuesday by the Office of Petroleum Coordinator.

Use on road work has been curtailed in 17 eastern states since April 24, but the ban is now tightened and extended to 21 midwest and southwestern states. Road oil may not be used for any paving work but must be used only for fuel. Asphalt and tar products may be used on highways on certificate from U. S. Public Roads Administration that it is essential for war purposes. On nonhighway paving projects, except airports, a certificate must be obtained from OPC director of marketing before tar or asphalt may be used. Order is effective immediately, but in Districts 2 and 3 asphalt and tar, but not road oil, may be used until July 22 if already on project location, and deliveries may be made until July 12 under written contracts made prior to July 2.

Recommendation was based on a survey showing over-all shortage of asphalt and diversion of transportation equipment.

For the last half of 1942 East Coast district will have shortage of 452,000,000 gal. of asphalt below essential industrial and military needs, and Midwest will have shortage of 142,000,000 gal. Southwest refineries have scheduled 38,000,000 gal. of asphalt above minimum essential needs of that district but this will be diverted to Midwest and eastern areas.

Order also requires all shipments of asphalt and tar under 200 miles be by tank truck.

Donald M. Nelson has certified to Justice Department that actions under Recommendation 45 are exempt from antitrust laws.

Railroad Shipments Fall Slightly to 720,720 Bbl. Daily

WASHINGTON, D. C.—Rail movement of oil to the East Coast during the week ended June 27 was at a rate of 720,720 bbl. daily. This represents a decrease of 11,040 bbl. daily from the volume moved during the week ended June 20, when car loadings averaged 731,760 bbl. per day, the highest average reported by OPC.

In shipping 720,720 bbl. daily, 31 companies loaded 24,024 cars. Including cars that were on the way back for reloading, it is estimated that the East Coast service employed 56,000 cars, taken largely from other sections of the country.

On the basis of an average of 210 bbl. per car, the 24,024 loaded cars carried the equivalent of 5,045,040 bbl. of petroleum and petroleum products during the week.

Eastern shipments were: Allied Oil Co., 25 cars; American Bitumuls, 105; American Mineral Spirits Co., 88; Arkansas Fuel Oil Co., 143; Ashland Refining Co., 83; Asiatic Petroleum Co., 2; Atlantic Refining Co., 2,467; James B. Berry Sons Co. 16; Canfield Oil Co., 2; Chalmette Petroleum Co., 37; Cities Service Oil Co., 1,243; Continental Oil Co., 247; Crown Central Petroleum Co., 31; Daugherty Refinery, 23; Gulf Oil Corp., 1,902; Hartol Products, 83; Pan American, 1,697; Petrol Corp. 259; Petroleum Heat & Power Co., 63; Pure Oil Co., 312; Roosevelt Oil Co., 6; Shell Oil Co., Inc., 1,077; Sinclair Refining Co., 2,328; Socony-Vacuum Oil Co., 2,803; Standard Oil of Kentucky, 92; Standard Oil of New Jersey, 4,797; Standard Oil of Ohio, 38; Sun Oil Co., 1,540; Talco Asphalt & Refining Co., 15; Texas Co., 1,974; and Tide Water Associated Oil Co., 526.

W.P.R.A. Symposium on Fuel Oil to Be Concluded

A meeting of the technical group of the Western Petroleum Refiners Association will be held on Friday, July 10, at the Randolph Hotel in El Dorado, Ark, beginning at 4 p.m.

The association's June meeting in Shreveport was featured by a symposium on specifications, but it developed that time was insufficient to complete the program, and the third section of the symposium was carried over and will be concluded at the July meeting in El Dorado. This section, dealing with fuel-oil specifications, will be presented by Roy Wilson, of Lion Oil Refining Co.

Construction to Start Soon On Bayou-Plantation Link

HOUSTON, Tex.—Preliminary work on the construction of Bayou Pipe Line Co. system combination 8 and 10-in. products line from Houston, Tex., to Baton Rouge, La., is under way and few details remain to be worked out before actual construction is started. This line, known as Project 2-A, will be constructed from reclaimed pipe. Work of digging up several old lines is now under way.

The Bayou line will tie in with the Plantation Pipe Line Co. system at Baton Rouge and will be approximately 255 miles in length. The Houston-Beaumont end will consist of 8-in. while the Beaumont-Baton Rouge section will be of 10-in.

Several companies are interested in the project with Shell Pipe Line Co. having charge of construction and operation.

Duplicate Material Orders Must Be Cancelled Under PRP

WASHINGTON, D. C.—The provision of Priorities Regulation 11 which requires companies operating under the Production Requirements Plan to cancel duplicating orders as soon as they receive their third-quarter PRP certificates was emphasized last week in a statement by J. S. Knowlson, director of industry operations.

"In order to clarify the picture of materials requirements of war industries," Mr. Knowlson said, "it is essential that no company should have orders outstanding for greater quantities of materials than it actually requires or will be permitted to receive.

"Because of the shortage of materials many companies have placed duplicate orders with two or more suppliers, with the intention of canceling the rest when one is filled. This practice gives a distorted picture of materials requirements, and it is therefore forbidden, for all companies operating under the Production Requirements Plan. If such a company has orders outstanding calling for delivery in the third quarter of more material than it may receive under the terms of its PRP certificates, the duplicating orders must be cancelled immediately upon receipt of the third-quarter certificate."

The regulation also requires placing of purchase orders with spacing of delivery dates, so far as practicable, to spread deliveries equally over the 3 months covered by the PRP certificate, and specifically forbids receipt of more than 40 per cent of permitted deliveries of any material in the first month of the quarter, or more than 80 per cent in the first 2 months, except in unusual situations.

Efforts Are Made to Stop South and West Barging

The most efficient handling of barge facilities to assure movement of the largest possible supplies of oil northward and eastward, is sought in a program being evolved. Elimination of barge shipments of crude oil and refined products southward and westward is one of the chief objectives. Special attention is being directed to the elimination of a large part of the barging of crude and products from Louisiana to Texas.

The joint barge subcommittee for Districts 1, 2, and 3, Office of Petroleum Coordinator, has several proposals under consideration. The subcommittee was appointed under Recommendation 51. Headquarters have been established at 624 South Michigan Avenue, Chicago, Ill.

The committee has been working on the problem for several weeks, according to reports, seeking voluntary cooperation to bring desired results. This calls for exchanges between companies and various alterations in transportation plans. It is understood that this program is more desirable than handling shipments according to a plan which would call for allocation of barge facilities used on rivers and intracoastal waterways.

Voluntary programs of a similar nature are being worked out for pipe lines and tank-car movements.

Ritchie Field Price Order Retroactive to February

WASHINGTON, D. C.—Price Administrator Leon Henderson has made retroactive to last February 2 maximum prices for crude oil in Ritchie field, Acadia Parish, Louisiana, which were established April 23 in Amendment 7 to Revised Price Schedule 88 (petroleum and petroleum products).

The action, effected by Amendment 19, was taken for the reason that all persons affected by the maximum price established by Amendment 7 requested that it be made retroactive.

Amendment 7 established a maximum price of $1.48 per barrel for crude of 40° A.P.I. gravity and above, with customary differentials for lower-gravity crudes.

Only Sun Oil Co., Continental Oil Co. and three producers are affected by the amendments.

Oil Companies Immunized For Directive 53 Compliance

WASHINGTON, D. C.—WPB Chairman Nelson Tuesday certified to the Department of Justice that he has approved Recommendation 53 of Petroleum Coordinator Ickes and that actions pursuant to it are immune from antitrust prosecution. Nature of Recommendation 53 is a military secret and text has been withheld, but companies affected have been informed privately.

Review of Secondary Recovery In the United States (Part 1)

By PAUL D. TORREY

SECONDARY recovery is defined as: "The oil, gas, or oil and gas recovered by any method (artificial flowing or pumping) that may be employed to produce them through the joint use of two or more well bores. Secondary recovery is generally recognized as being that recovery which may be obtained by the injection of liquids or gases into the reservoir for the purpose of augmenting reservoir energy; usually, but not necessarily, this is done after the primary recovery phase has passed."

From this definition it will be recognized that there are four fundamental requirements for the application of secondary-recovery methods: (1) An injection well and, (2) a producing well or wells all drilled into a (3) common porous oil, gas, or oil and gas-bearing formation through which (4) liquids or gases are forced under artificial pressure for the purpose of increasing oil recovery. This article is devoted to various phases of secondary-recovery operations, and the results that have been obtained from their application.

The chief purpose of this article is to show how secondary-recovery methods are being used and may be used in the United States. Consideration will be given to the possibilities of mining for petroleum, a secondary or perhaps more properly a tertiary method of a final salvaging nature, which, so far, has been employed in this country only on an experimental basis. Attention, also, will be given to the relation that the possibility of production of oil from shale deposits and the manufacture of substitute fuels may have on the future expansion of secondary-recovery operations.

Contributions by Muskat[2] on "Theoretical Considerations Involved in Secondary-Recovery Operations"; by Hardwicke[3] on "Statutes Relating to Secondary-Recovery Operations"; and by the author[4] on "The Economics of Secondary-Recovery Operations" have developed information to such extent and of such originality that separate consideration is justified. However, much can be said without serious repetition, in a general review of secondary-recovery operations in the United States, and in regard to the vast reserves of oil that have been and may be made available by the application of these methods. These general subjects will be the object of more specific attention.

Secondary-Recovery Activity in the United States

In the following discussion, a brief review, by states, of secondary-recovery operations is presented.

New York

The production of oil in New York is more dependent on secondary-recovery operations than in any other oil-producing state. The oil fields of New York are restricted principally to three counties—Cattaraugus, Allegany, and Stueben—which parallel the Pennsylvania border in the southwestern part of the state. In some respects, the New York fields are similar to nearby fields in Pennsylvania. However, in other details they are lacking in similarity, the sands being less continuous and more variable in lithology. For this reason the productive characteristics of most of the New York fields, from the standpoint of secondary-recovery operations, are not so consistent as in the nearby Bradford field, which is located principally in Pennsylvania. Some areas are exceptionally prolific; others are of average productivity; and some large areas are of marginal quality.

Water flooding is used almost exclusively in New York as the secondary-recovery method for increasing oil recovery, the reservoirs being poorly adapted to air and gas repressuring.

The oil fields of New York were rapidly approaching the stage of ultimate depletion by natural methods of production when the beneficial effects of water flooding first became known. Undoubtedly, the state's production, if it had not been stimulated, would now be most meager, if not entirely exhausted. The application of water flooding in New York has increased enormously the production over what it was in 1920, and at the same time the ultimate recovery has at least been doubled. In New York State is an outstanding example of the absolute preservation of the oil industry by secondary-recovery operations. At the current rate of production from the proven reserves, the profitable existence of the state's fields will be extended for quite a few years to come.

Pennsylvania

The oil-productive territory of Pennsylvania, from the standpoint of secondary-recovery operations, may be classified into six districts or areas. These are distinguished by geographic location and by differences in the geologic age of the producing formations and the character of the production.

The Bradford district consists of the large and very important Bradford field and the nearby, smaller Guffey and Burning Well (Kanesholm) fields, all of which are located in McKean County. These fields produce from the Bradford Third sand and are the fields in which water flooding has been particularly effective. The application of air and gas repressuring has not been so successful. Intentional water flooding was first practiced in the Bradford field, and almost every important improvement in the efficiency of water-flooding operations has been developed there. The increase in oil production resulting from water flooding has been even more impressive than in the fields of New York. Here again is an outstanding example of the perpetuation of the oil industry and the conservation of an extremely large and valuable reserve of oil by secondary-recovery methods.

The Kane-Clarendon district, which includes the Kane, Cooper, Balltown, Cherry Grove, and Clarendon fields, is located in southwestern McKean County, northeastern Forest County, northwestern Elk County, and eastern Warren County. These fields produce from a series of sands occurring within a fairly short geological interval in the Canadaway group of Upper Devonian age. There are a few air and gas-repressuring projects in this district, and parts of the Clarendon field

This article will constitute one of the chapters in a Special Bulletin on Secondary Recovery in the United States, which will be published by the American Petroleum Institute later in the year. It was presented in abridged form at a recent joint meeting of the Houston chapter, American Petroleum Institute, and the Houston Geological Society, at Houston, Tex.

Mr. Torrey, the author, is chairman of the Central Committee on Drilling and Production Practice, A.P.I. He received his degree of bachelor of science in petroleum geology from University of Pittsburgh in 1925. He served for 2 years with the Oil and Gas Division of the U.S.G.S., in Utah, Wyoming, Montana, Arkansas and Pennsylvania. Then he went with the Northwestern Pennsylvania Oil Producers Association as geologist and petroleum engineer, devoting most of his time to studying the Bradford and Allegany fields. Since 1928 he has practiced as consulting geologist and engineer specializing on secondary methods for increasing oil recovery, with the exception of a period during which he served as geologist for Sloan & Zook Co., in charge of exploration work in the Texas Gulf Coast and Louisiana.

The article will appear in two instalments, the second to appear in next week's issue. List of references will be published with second installment.

have responded to water flooding with fairly good results.

The Venango or Upper Middle district extends from Grand Valley on the north to the town of Franklin on the south and includes a large number of fields in southwestern Warren County, eastern Crawford County, and northern and central Venango County. In this district oil is produced from the Venango sand series of Upper Devonian age at relatively shallow depths. In the Venango district, air and gas repressuring have been applied more extensively than in any other district of Pennsylvania. The first oil produced in the United States by intentional drilling came from this area, and most of the fields had reached their maximum peak of production and had already produced the greater part of their natural recovery before oil was even discovered in the Mid-Continent states.

These Venango fields, the very birthplace of the oil industry, have been preserved largely in profitable production by secondary-recovery operations. The oil reservoirs are much better adapted to air and gas repressuring than to water flooding. On account of a combination of relatively shallow depth, good average recovery, and a favorable price for crude, it has proved in certain instances to be economic to redrill almost entirely some properties and fields which previously had been abandoned by reason of their failure to produce profitably under conventional operations. This condition is very unusual in air and gas-repressuring projects elsewhere.

The operation of air and gas-repressuring projects in the Venango district has contributed largely in establishing the proper technique in this type of secondary-recovery operations, just as the operation of water-flooding projects in the Bradford field has established a technique for that phase of secondary-recovery operations. Here, in addition to the actual redrilling of properties, the first effort was made to develop projects in accordance with a systematic well-spacing pattern, and some of the earlier and most effective attempts to combat bypassing had their origin in the near vicinity of the site of the first discovery well. It is also a matter of great significance that in the Venango district the first major attempt in the United States is now being made for the mining of petroleum.

The Bullion-Butler or Lower Middle district consists of fields located in southern Venango County, western Clarion County, northwestern Armstrong County, and all of Butler County. Oil production is obtained in large part from the lower members of the Venango sand series. Repressuring by air and gas injection has been conducted only on a very limited scale on account of greater drilling depths which make it uneconomic, under existing price schedules, to redrill abandoned or partially abandoned fields. However, the reserves of oil in this district are known to be large, and it appears to be only a question of time when a local scarcity of oil may result in a price for crude sufficiently high to make it attractive to rework the fields in this area by secondary-recovery methods.

Several fields, producing principally from the Berea sand, of Mississippian age, in Mercer, Lawrence and Beaver counties, constitute another productive district of Pennsylvania. Some attempt has been made to increase the recovery of oil in these fields by the application of secondary-recovery methods with fairly good but rather short-lived results. Whether this has been due to poor planning and management, to unfavorable reservoir conditions, or to an actual lack of adequate amounts of residual oil cannot be stated at this time. However, encouraging results obtained from repressuring operations in the Berea in nearby fields in Ohio and West Virginia indicate that the first factor mentioned may be responsible for the absence of more satisfactory recovery.

The southwestern district of Pennsylvania, consisting of southern Beaver and Allegheny, Greene, and Washington counties, in the point of average field age, is the youngest producing area in the state. In this district, notwithstanding a greater average depth to the producing formations, new oil wells are occasionally completed, these largely being accidental discoveries made in connection with the drilling of wells for gas. On account of high cost of well completion and what appears to be an extremely conservative attitude on the part of the operators, secondary-recovery methods have not been applied as extensively as in other areas of the state. However, the few projects now in operation have resulted in exceptionally satisfactory production, and taking into consideration the excellent, natural production history and probably favorable reservoir conditions in many of the fields, it is very reasonable to anticipate widespread and highly successful secondary-recovery operations in this district in future time.

From the standpoint of total production derived from secondary-recovery operations, Pennsylvania is the most important state in the country. In Pennsylvania, geological and economic conditions generally are more favorable for the application of second-recovery methods. In addition to these assets, the oil industry of Pennsylvania in recent years has benefited from a most aggressive and enterprising leadership and from very able technical assistance. Such a combination can hardly fail to produce results of an outstanding nature. The pioneering secondary-recovery work which has been done in Pennsylvania is known and recognized the world over, and it is notable that a project for the tertiary recovery of oil, by mining, is now being initiated. Pennsylvania may again lead the nation in pointing the way to greater efficiency in oil recovery from fields only partially depleted by natural methods of production. Certainly, this initial mining venture should be the object of close observation.

West Virginia

Many of the oil fields of West Virginia, similarly to those of southwestern Pennsylvania, still are yielding oil profitably by primary methods of production. This is due principally to a system of selective abandonment of wells. The better wells in the better parts of the fields, which can maintain a profitable production, are retained, and the poorer and marginal producers are abandoned. This process has resulted in a wide spacing of the remaining wells, and, in consequence, the effects from most of the fairly numerous air and gas-repressuring projects have not been nearly so spectacular as in some of the more closely spaced fields of Pennsylvania. However, if consideration is given to the fact that in many instances the poorest producing wells in the property or field, as the case may be, have been converted for injection purposes—the operator being reluctant to dispense with the production from the better and more favorably situated wells—and also if consideration is given to the average wide well spacing, previously mentioned, it becomes evident that the results from air and gas repressuring in certain West Virginia fields have been very good.

Another factor which has affected detrimentally the results from secondary-recovery operations in West Virginia is the dependence, in many fields, on income from the sale of gas. During the winter months, when there is a good demand, the gas produced along with the oil will be sold rather than returned to the sand for repressuring purposes. On this account, in quite a few fields, the injection of gas back into the originating reservoir is intermittent and is restricted to the summer months. Many of the secondary-recovery projects utilize facilities for repressuring which are employed for the compression of gas in gasoline-extraction plants during the winter months.

Even in fields where promising results have been obtained from repressuring, there has not been the incentive to intensify the operations, such as has been done in several fields of Pennsylvania, on account of greater drilling depths and a lower crude price. Notwithstanding these difficulties, it is encouraging to note that the abandonment of wells in many fields has not progressed to the stage that they cannot be at least partially reclaimed, without too great additional cost, by secondary-recovery operations.

The oil-productive territory of West Virginia is extensive, with production being obtained from sands of Pennsylvanian, Mississippian, and Upper Devonian age. Many of the fields have had a substantial natural recovery. Most of the primary production has been obtained by internal gas drive, with water drive playing only a minor part in the recovery of oil. Therefore, it is probable that the primary recovery efficiency may not have been exceptionally good, although better than average drainage effects may have resulted from a high average permeability of pay sections, which is indicated by large initial production of many wells. Although the residual oil content per foot of pay section may be very good, the relatively thin pay sections which prevail in many fields point to the conclusion that secondary-recovery operations in West Virginia may never approach the intensity of development which already has become common practice in certain fields of Pennsylvania. However, the situation in West Virginia, in so far as the future of secondary-recovery operations are concerned, is certainly not discouraging, and there is every reason to believe that the fields of the state will yield substantial quantities of oil by the application of these methods.

Although few cores have been taken of the oil-producing formations of West Virginia, it is generally believed that they are better adapted to air and gas repressuring than to water flooding. One experimental water flood is in operation in the Cabin Creek field; all of the other secondary operations consist of air or gas-injection systems.

Ohio

The oil fields of Ohio are divisible into three separate productive districts, these districts being based upon geographic location and on the geological age of the producing horizons. The Trenton limestone fields, of great importance in the early days of the oil industry, are all located in the northwestern part of the state. The Clinton sand oil and gas fields extend in an almost continuous band of production, in the east-central part of the state, from Lake Erie southward almost to the Ohio River. The shallow fields, producing from sands of Pennsylvanian and Mississippian age, are found distributed throughout eastern Ohio, and are especially concentrated in Noble, Monroe, and Washington counties in the southeastern part of the state.

Attempts to repressure the Trenton limestone fields have not been successful. Results from air and gas repressuring in the Clinton sand fields have been variable. Some of the projects have not yielded sufficient additional oil to justify their continuation. Others have been moderately successful. The degree of success attained in secondary-recovery work in the Clinton sand fields may be judged by the fact that, out of some 23 of the older fields, only two active repressuring projects are now in operation. The wide spacing

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Natural Gas News

Helium Production to Be Expanded at Amarillo

WASHINGTON, D. C.—Helium will be produced in greatly increased quantities to meet expanding wartime demands under a program recently inaugurated by the Bureau of Mines, it was announced last week.

Millions of additional cubic feet of lightweight helium will flow from the bureau's enlarged helium plant at Amarillo, Tex. In addition, a new helium-production plant at an unannounced location will be supplied with helium-bearing natural gas from an existing pipe line transporting gas for fuel markets.

A new congressional appropriation of $4,000,000 to be made available from Navy Department funds, will enable the Bureau of Mines to effect the expansion of its helium-producing program and comply with requests of the U. S. Army and Navy for more helium to inflate blimps and barrage balloons and for deep-sea diving.

Although restricted by military necessity from announcing specific figures and locations, plans are being drawn for the construction of another plant which will extract helium from natural-gas reserves already being operated by a private concern.

In 1929, the bureau designed and constructed the present plant near Amarillo, and the entire Cliffside field of 50,000 acres was brought under government control.

During the past 12 years the bureau has produced over 100,000,000 cu. ft. of helium from this field, but never had utilized the full capacity of the plant until the last year.

Helium production from natural gas, in the process employed at the bureau's Texas plant, involves the separation, or isolation by low-temperature fractionation, of the helium from other gaseous constituents. Bureau engineers state that natural gases containing helium are widely scattered over the United States, but only a few localities have been discovered in which the helium content of the gases and the reserves are adequate for large-scale production at low cost.

The treatment of asthma with helium-oxygen mixtures is an important field of use for this gas and it is being investigated further by the medical profession. More helium is required for this purpose than for any of the other "breathing" uses. Experiments are now being conducted by the Bureau of Mines and medical authorities with regard to helium as a diluting agent in anesthetics to prevent fires and explosions in operating rooms. Medical research is also being directed toward the use of helium-oxygen to alleviate tubal and sinus blocks in compressed-air workers. The same helium-oxygen mixtures employed to give relief to deep-sea divers have been applied to workers in caissons and tunnels where the pressure is considerably above that of the atmosphere.

Ohio Cities Complain About Rates for Natural Gas

WASHINGTON, D. C.—The Federal Power Commission last week received complaints from the cities of Cleveland, Euclid, and Lakewood, Ohio, asking that the commission order East Ohio Gas Co. to show cause why it should not ascertain and submit the original cost of its properties in compliance with various orders of the commission addressed generally to all natural-gas companies. Each of the complainants cites the commission's ruling of March 12, 1942, in the matter of the Minnesota Power & Light Co. that "Reclassification and original cost studies are an essential aid to prosecution of the war effort in that they provide a sound basis for the most effective control of prices of utility services entering into practically every important essential war activity as well as into the general cost of living."

The commission also announced its receipt of petitions by the three cities for leave to intervene in the proceedings before the commission on the application of East Ohio for a certificate of public convenience and necessity under Section 7(*c*) of the Natural Gas Act, as amended, for continued operation based on February 7, 1942, or a finding by the commission that East Ohio is not a natural-gas company under the act. The petitions state that the cities' interests in the proceedings arise from their complaints in the matter of the original cost of East Ohio's gas plant.

In its order and Opinion 76 announced June 1, the commission ordered the Hope Natural Gas Co. to reduce its rates to East Ohio Gas Co. (which serves Cleveland, Euclid, Akron, Youngstown, Massillon, Canton, and a number of other Ohio communities) from 36.5 to 29.5 cents per 1,000 cu. ft., effective as to all bill based on meter readings made on or after July 15, 1942, which will reduce East Ohio's natural-gas costs by $2,820,000 a year. In a separate finding, issued concurrently with the order and Opinion 76 pursuant to a petition by Cleveland, the commission determined, as an aid to state regulation, that Hope's rates to East Ohio had been unlawful since 1939.

Data Issued on Studies of Condensate-Type Wells

More effective methods of developing extremely deep condensate-type oil wells, especially in the Gulf Coast area of Louisiana and Texas, is sought by the Bureau of Mines in studies of experimental data obtained from one well in which gas and liquid constituents of reservoir fluids were subjected to a wide range of tests.

Data were obtained for the complete range of pressure, temperature and mixture proportions in efforts to provide a reference scale for evaluating properties of fluids produced from similar wells at different gas-liquid ratios. The gas and liquids obtained from one well were recombined in different proportions to provide 10 natural hydrocarbon mixtures for study at pressures up to 5,000 lb. per sq. in. and at temperatures ranging from 70° to 280° F.

Proper control of underground pressure during production is essential to economical development of condensate-type oil wells, the Petroleum and Natural Gas Division of the bureau reports. Unwise reduction may result in the precipitation as liquid and subsequent loss of valuable hydrocarbons.

Knowledge of condensation processes is becoming increasingly important as this type of operation is extended to recover gas and liquids from newly developed reservoirs which frequently are 10,000 ft. or more below the surface.

The report is styled: "Report of Investigations 3642, Specific Volumes and Phase-Boundary Properties of Separator Gas and Liquid Hydrocarbon Mixtures."

Natural Gasoline

Fred Hall Honored for Long Service With F. C. Henderson

SAN ANTONIO, Tex.—Fred C. Hall, general manager of the Frank C. Henderson oil and natural-gasoline properties, was honored at a luncheon here recently commemorating his twenty-fifth anniversary as an employe.

Mr. Hall is general manager of the Rainbow Gasoline Corp., the Henderson Co., F. C. and E. P. Henderson, Inc., Agua Dulce Co., Reliance Development Co., and Henderson Trusts. He first joined the Henderson interests as office manager at Nowata, Okla., in 1917. He became general manager and secretary in 1926. Company headquarters were moved to Tulsa in 1926, to Amarillo in 1934, and to San Antonio, Tex., in 1939.

Humble Engineer Joins OPC As Natural-Gasoline Analyst

WASHINGTON, D. C.—Charles E. Webber, formerly gas engineer of Humble Oil & Refining Co., Houston, Tex., has been appointed senior analyst in the Natural Gas and Natural Gasoline Division of OPC to deal primarily with natural-gasoline projects under M-68.

Recycling News

Texas Commission Delays Recycling Regulatory Order

AUSTIN, Tex.—Two provisions of the Railroad Commission's new order regulating recycling operations in Texas, which were to have become effective July 1, were modified last week. Effective date of the order was postponed until August 1 and one portion of the original order, Paragraph 2, Subsection D, requiring the metering of gas injection into each formation, was deleted from the revised form.

Metering of gas returned to the individual producing formations was removed from the requirements because plant operators were experiencing difficulties in obtaining the types of meters necessary.

George M. Kirkwood, superintendent of Gasoline Products Corp.'s Grapeland plant in East Texas, was one of the leaders in seeking postponement of the effective date and modification of certain points.

Objections centered on that part of the rule limiting the volume of vapors flashed to the atmosphere, which reads:

"No recycling plant operating in the State of Texas shall be permitted to vent any gas taken into said plant from statutory gas wells except, however, the commission is of the opinion that reasonable compliance will permit the venting of a volume of flash vapors not to exceed 2 per cent of the volume of gas taken into said plant."

Representatives of Lone Star Gas Co. advised the commission that the company has made application for priorities on equipment to recover isobutane in its Grapeland field operations. They said that Lone Star would be glad to negotiate with other operators for their excess butane.

House Committee Commends OPC for War Activities

(Continued from Page 15)

"Now this episode, and the 100-octane program, have, it seems to me, the elements of the dramatic," Mr. Davies continued.

"These attributes are not so apparent in that phase of our work which has to do with telling oil men that they can't have materials which they want, because those materials are scarce. But, as a commodities branch of the War Production Board, we must make those denials—yet make them in such a way that there will be no hampering of the production of petroleum war materials. This has been a job for experts.

"And perhaps there is not entire lack of the dramatic in the fact that the oil man who gave up 1,000 ft. of casing has yielded material for ten 37-mm. antiaircraft guns; that the driller who sacrificed a steel derrick sacrificed the equivalent of a medium tank; and that the operator who went without 250 ft. of rotary chain was, in effect, producing 100 Garand automatic rifles.

Most Complex Industry

"There is probably no industry more complex or more highly technical than the oil industry. Its magnitude alone makes for complexity, embracing as it does some 300,000 marketers, 180,000 producers, and hundreds of refiners and transporters. It is a delicately balanced, finely interrelated mechanism, extremely sensitive to dislocations which to the layman might seem inconsequential. These factors we must bear constantly in mind as we strive to mobilize the industry most effectively for war, and to cushion it, in so far as that is possible, so that the shocks of war shall not interrupt its productivity or force parts of it out of the fight altogether.

"For these reasons the coordination of oil has been and needs to continue to be a job for experts, for practical oil men thoroughly trained in the realities of oil, and not for dilletantes nor theorists. We have obtained a great deal of this expert assistance from the industry itself, through our district committees, through the Petroleum Industry War Council, and through the technical subcommittees which have been set up to deal with specific problems. I should not attempt to estimate the millions of dollars which it would cost our taxpayers if we had to pay these industry executives and technical men a reasonable compensation for the talent which they are contributing to their government without cost.

"Our own staff has been undermanned from the beginning, and it is still undermanned. It is only because the members of it, from directors to typists, have been willing to work inhumanly long hours that the work which had to be done has been done unfailingly.

"The reward—well, a general in the U. S. Army provided it the other evening when he stated, 'I believe that the Office of Petroleum Coordinator is entitled to feel a certain pride in this fact, so far in this war the Army has not lacked for a single barrel of oil.' You may be sure that we do take pride in this fact. Our only hope is that the same may be said when the war has ended.

"This is an office that exists to do a war job. It is a temporary operation; the more temporary the better, so far as those in the office are concerned. As soon as the war comes to an end, we want to wind up this operation and call it a day and go home. The people we have recruited have come here with that idea in mind. They have come here because we have asked them to come here and do a job for Government in time of war. They have important places in industry. They are anxious to get back. They have no aspirations as regards building up a permanent governmental bureau."

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Government to Lay American Liberty Line Across Florida

WASHINGTON, D. C.—Jesse Jones, secretary of commerce, Tuesday announced that Defense Plant Corp. has agreed to buy an 8-in. pipe line from American Liberty Pipe Line Co. of Dallas, Tex., now operating between Longview and Houston, approximately 195 miles, and to have the pipe line and all its appurtenances moved to Florida and relaid between Carrabelle on the west side of the state to Jacksonville on the East Coast.

The line will carry gasoline and light oil, and have a capacity of 35,000 bbl. a day. The purchase price of the pipe line will be $1,200,000. To remove the pipe line and all equipment and facilities and provide new terminals, etc., will require a total expenditure of approximately $2,900,000, including the cost of the pipe line. It is expected that the pipe line can be in operation in approximately 4 months and that oil barges with necessary tugs can be made available from existing facilities, but that new oil barges will also be built to serve the system's terminals.

General Expropriation Unaffected by Court Ruling

Action of the Mexican Supreme Court in finding that the expropriation of two small subsidiaries of the Standard Oil Co. (New Jersey) was illegal was regarded as being without significance in so far as the major expropriation question is concerned. The court ruling applied to two "inactive" companies, Titania and Mercedes but did not affect Huasteca or Transcontinental, principal operating subsidiaries of Standard.

Since the court's decision was apparently based on the fact that the companies were inactive at the time of the expropriation decree, it was interpreted as being also applicable to other companies which enjoyed a similar status. Nine other New Jersey companies, all small, would be included if this interpretation proves correct.

Both Titania and Mercedes were domiciled in the State of Tamaulipas and neither had begun to produce oil at the time the expropriation decree went into effect.

State Regulatory Officials To Discuss Six Problems

WASHINGTON, D. C.—A tentative agenda for the second meeting of the National Conference of Petroleum Regulatory Authorities in Washington July 9 was received early this week by the Office of Petroleum Coordinator from Hiram M. Dow, chairman.

Among important subjects on the docket are:

A proposal for a uniform method of reporting production and a uniform reporting date for use by state and federal agencies in estimating production trends.

Methods of allocation and proration of condensates, distillates and natural gasolines.

Proposals for uniform regulation of dual completions where the same well taps more than one horizon.

Discussion of bonus incentives and release of materials for wildcat drilling to increase reserves.

Discussion of methods of certifying monthly production rates and compliance by states.

Discussion of materials conservation programs.

DEATHS

GEORGE D. LOCKE, retired vice president of Barnsdall Oil Co., died last week at Rancho Santa Fe, Calif., after a long illness. Mr. Locke enjoyed a wide acquaintance in the oil industry, it being said that he knew personally nearly every leading executive in the business. Mr. Locke's association with Barnsdall began 21 years ago when Bigheart Producing & Refining Co., of which he was vice president and sales manager, was purchased by Barnsdall. He then became a vice president of the Barnsdall organization, and divided his time between Chicago and Tulsa. He was elected a director in the Barnsdall company in 1933, and served as such until 1936. Among his duties was the handling of international sales for the company, in which capacity his travels took him to South American countries. He was active in refinery association work, serving as president of the Western Petroleum Refiners Association in 1932.

Mr. Locke was born in Illinois in 1874. Before entering the oil business he was prominent in Arkansas as president of Midwest Gas & Electric Co. He left that organization to join the Bigheart company. He retired from the Barnsdall organization in 1937, and since that time he has been interested in fruit growing as an avocation. He is survived by his widow and two sons. Funeral services were held last Thursday at St. James Church of Del Mar, Calif., and interment was at Oceanside, Calif.

T. J. STEUART, assistant to the president of the Independent Petroleum Association of America, died July 6 in a Washington, D. C., hospital. He had been critically ill for several weeks. Mr. Steuart joined the I.P.A.A. staff in 1931 and maintained his offices at the Washington headquarters of the association. He is survived by his widow, a daughter and two sons.

LOUIS C. EDGAR, assistant chief engineer of Carnegie-Illinois Steel Co., Pittsburgh, Pa., died at his home in Pittsburgh last week.

WILFORD H. SHELDON, 76, former secretary-treasurer of Commercial Oil Co., Houston, Tex., died last week. He had lived in Houston since 1906. His wife, three daughters and two sons survive.

GRANT HITCHCOCK, 70, for 63 years a resident of Bradford, Pa., where he was an oil producer, died at his home after a long illness. Survivors include his widow, a son, a daughter, a stepson and three stepdaughters.

W. E. WATTS, 69, native Texan, who became an oil operator in Spindletop days, died last week at his home in Liberty, Tex., following a 2-day illness. His wife, two daughters and a son survive.

ARTHUR THOMAS GRAY, 48, secretary and treasurer of Kendrick-Gray Petroleum Co. and Jacksboro Refining Co., Jacksboro, Tex., died unexpectedly while in Fort Worth, Tex., on business. His widow survives.

W. D. TUCKER, 54, who was credited with major responsibility for the finding of the East Texas field, died at his home in Tyler, Tex., last week. It is said that it was largely through Mr. Tucker's efforts that C. E. Joiner was able to assemble his block and hold it together during the several years before the East Texas discovery well was drilled. His widow, two daughters and a son survive.

JOHN FITTS, 63, prominent figure in the oil fields of Oklahoma, died last week at Sulphur, Okla., after a heart attack. A native Georgian, Mr. Fitts came to the Cherokee Strip with his parents in 1893. He became known as the sage of Ada and the Arbuckle Mountains. He did not have a formal education in geology, but he acquired a large knowledge of the science from self-study, and the Fitts field was named for him.

ENGINEERING *and Operating* SECTION

Minimum Use Made of Critical Materials in Building Plant

By NEIL WILLIAMS

MEETING the need for conservation of materials essential to the nation's war efforts, the condensate-recovery and gas-cycling plant recently completed by American Liberty Oil Co., in the Blessing field, Matagorda County, Texas Gulf Coast, is specially designed to fulfill its objectives with a minimum use of critical materials. On account of the difficulty of securing new equipment especially fabricated for the purpose, it was found advisable to make use of used equipment, and such equipment was used where it could be found to suitably perform the job. Accumulators, steam stills, some of the heat exchangers, water-circulating pumps, electric generators and boilers are used equipment, converted to the duty required. The stabilizers were constructed from shells of used equipment, with the addition of new bubble trays. All of the high-pressure equipment, including the compressors, is composed of new equipment. Various of the heat exchangers were fabricated especially for this plant. All of the pipes, valves and fittings in the plant are new. Regulators, controls and instruments are new equipment, especially designed for the functions which they perform. Storage tanks and buildings are also new.

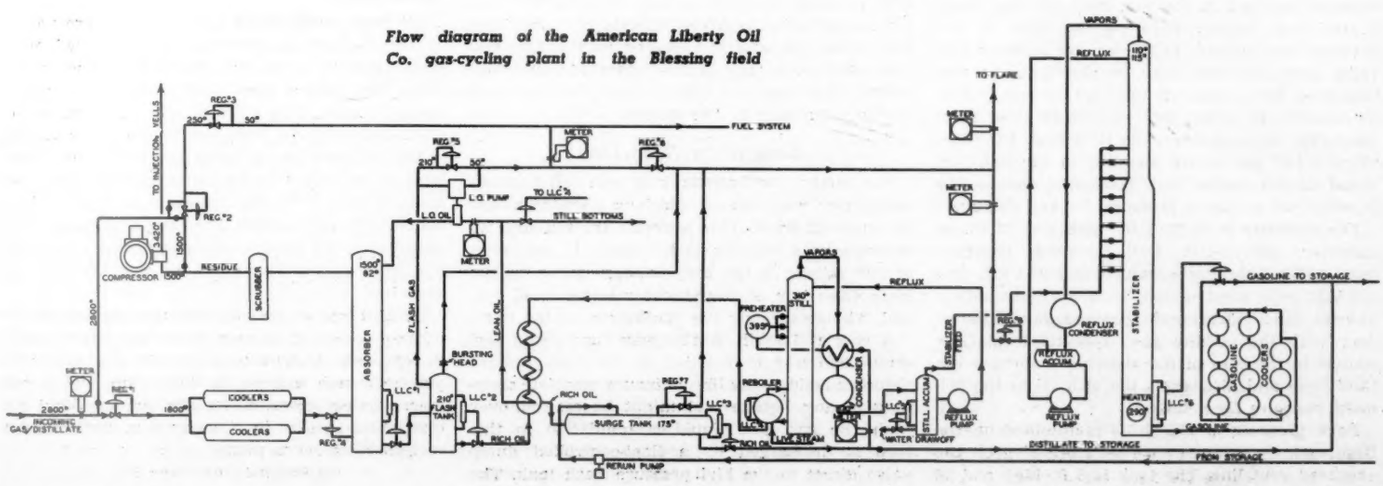
Absorption and compressor capacity has been provided for handling 28,000,000 cu. ft. of gas daily, which is produced by five wells from a gas-distillate sand at 8,100-8,200 ft. Well pressures average 3,100 lb. Regulation of flow from the wells and friction in the gathering system account for a drop of about 300 lb. in delivery of the gas to the plant gate at a pressure of 2,800 lb. The condensate content, extracted at absorption pressure of 1,500 lb., averages about 34 bbl. per 1,000,000 cu. ft., and has a gravity of 56°-60°.

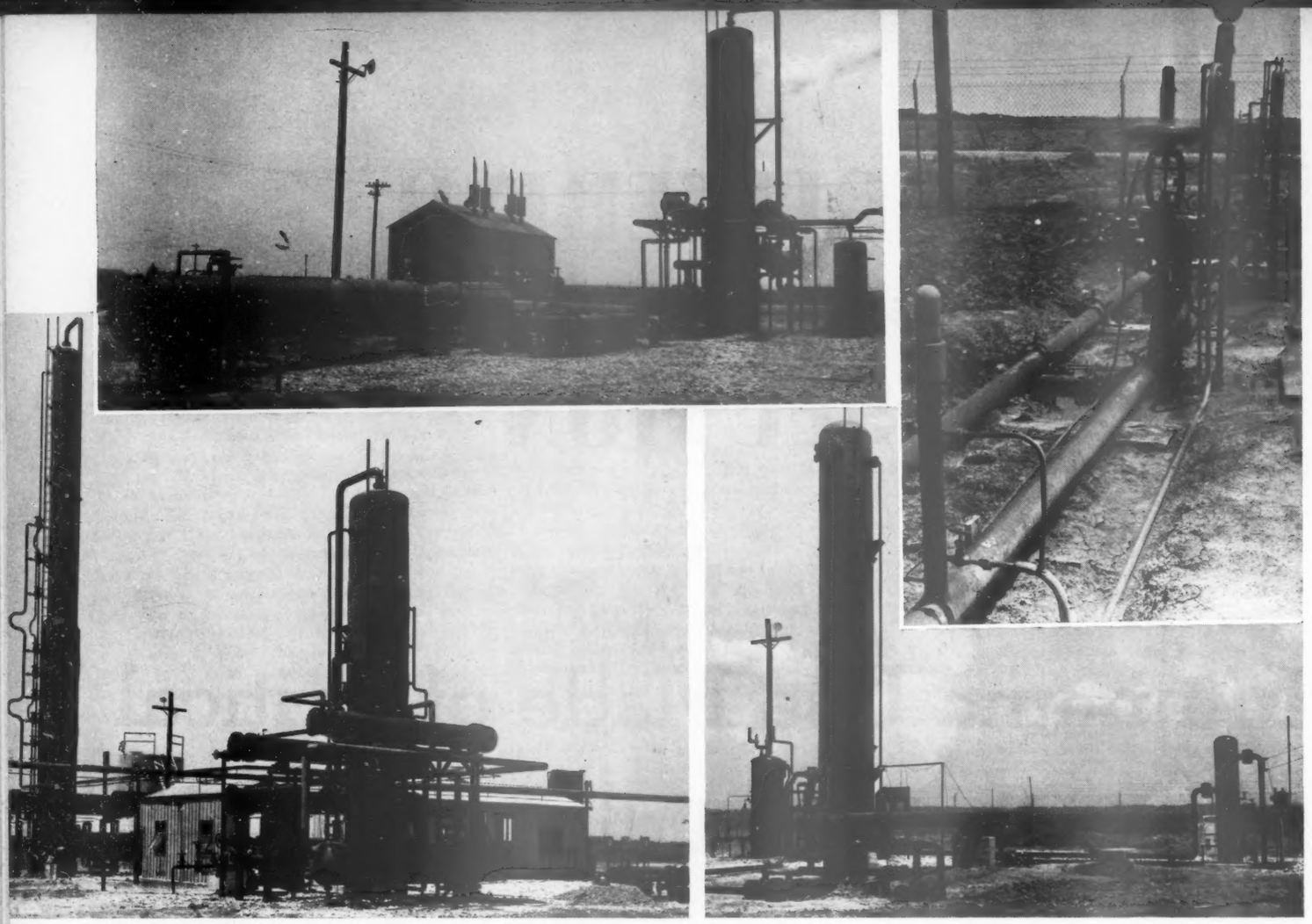
Approximately 50 per cent of the fluid production of the plant is now being delivered as a 12-lb. stabilized condensate to the Texas Co., which company discovered and developed the field, and with which company the American Liberty Oil Co. has an operating arrangement. The remaining 50 per cent of the output, marketed by the operator, is processed to produce 400 end-point motor fuel. Bottoms make a good diesel fuel, and all excess above absorption-oil requirements is marketed for that purpose.

Two 4-in. lines, constructed of extra heavy pipe, from different sectors of the field, deliver the high-pressure gas-distillate to the plant. A high-pressure gate valve on each of these lines at the plant permits closing of either or both lines. Feeder lines connecting the wells consist of 2½-in. upset tubing. Wells produce directly into the system without initial separation of fluids. The two lines converge at the plant into a single 6-in. inlet gas line of extra heavy pipe.

Pressures of the 2,800-lb. inlet gas is reduced in two stages to the 1,500-lb. operating pressure of the absorber. The first drop to 1,800 lb. is con-

Flow diagram of the American Liberty Oil Co. gas-cycling plant in the Blessing field





Upper left: Secondary flash tank, lean-rich oil heat exchangers and still

Upper right: Flow meter and pressure reducing regulator on gas-distillate inlet line

Lower left: Still (foreground), showing rich-oil preheater and reflux condenser and stabilizer unit

Lower right: High pressure absorber installation showing gas coolers in foreground, primary flash tank and special liquid separator and trap on residue-gas line

trolled by a pressure-regulating valve on the 6-in. inlet line. The second drop from 1,800 lb. to 1,500 lb. is controlled by a back-pressure valve on the discharge of gas coolers, through which the inlet gas passes to the absorber.

Coolers are of the shell-and-tube type. There are two of these, each 12 ft. long and 20 in. in diameter with 251 ft. of tube surface, and designed for 2,000-lb. working pressure. They are placed horizontally on the inlet line and operate in parallel. Gas passes through the shell around the tubes with water being circulated through the tubes as the cooling medium. The gas is expanded through a pressure-reducing valve into the absorber, which further reduces the temperature of the gas from 110° F., the temperature at plant inlet, to 82° F. at the high-pressure absorber, making possible more efficient absorption of the condensate.

As a safety factor, a differential pressure check valve is installed in the 6-in. inlet gas line ahead of the first pressure-reducing regulator. In the event of any rupture in the system between this valve and the high-pressure absorber, or any failure on the part of the pressure-reducing valve to function properly, this valve will close automatically, shutting down the flow from the field. Shear relief valves are installed in the line just ahead of the cooler inlet, protecting the coolers in event of excessive pressure for any reason.

The absorber is 32 ft. 1 in. high and 52 in. in diameter with 2¼-in. wall thickness, designed for 1,500-lb. working pressure under A.P.I. and A.S.M.E. code construction. It is equipped with a 44-vane mist extractor to prevent liquid carry-over with the residue gas. A liquid level float control in the base of the absorber maintains the fluid level and discharges the rich oil to the primary pressure flash tank.

Back pressure of 210 lb. is maintained on the flash tank by means of a regulator valve on the overhead vent line. The tank is 8 ft. high and 32 in. in diameter, and built for a working pressure of 300 lb. Flashed gas, containing fractions undesired for further processing, supply all fuel requirements, both for engines and boilers, and also is used to operate the high-pressure lean-oil circulating pump. This pump, a 12-in. by 3-in. by 14-in. horizontal-stroke unit, was manufactured for steam operation, but at 210 lb. the flash gas provides adequate pressure and permits an important economy in plant steam requirements. Gas for its operation is taken directly off the 210-lb. flash gas line, and is returned to the fuel system after pump duty. A float-operated liquid level control discharges the rich oil from the flash tank to the remainder of the system.

Emergency Vent Line

For safety, the flash tank is provided with an emergency vent line in which is installed a 300-lb. bursting drum. This prevents the building up of any excess pressure in the vessel in the event of any failure of the back-pressure valve on the main flash line or the absorber liquid level control. The emergency line discharges to the flare.

A special 1,500-lb. working-pressure liquid separator and trap is installed on the high-pressure absorber residue gas line to insure complete stripping of any liquids that might be carried over with the gas. The liquid accumulation in this trap is discharged by a float-controlled dump valve direct to the high-pressure flash tank. The separator is equipped with a high level control which operates electrically to cut out the magnetos and shut down the engines in event of excessive levels.

Two 600-hp., angle-type, six-cylinder gas-engine compressors return the dry gas to the producing formation. Taking suction from the 1,500-lb. residue gas, these discharge at pressures of 3,450 lb. for injection. The discharge header is constructed of double extra-heavy 6-in. pipe, which reduces down to 4-in. double extra-heavy return lines, one to each of the two input wells. A high-pressure gate valve on each return line permits closing of either or both lines. The compressors have relief discharge lines equipped with bursting drums for protection against backing up of excessive pressures in the input-well return lines. The compressor suction header is constructed of 6-in. extra heavy pipe, which is swagged into the 4-in. extra heavy residue gas line from the separator and absorber.

All pressure-reducing and back-pressure valves in the high-pressure system are enclosed with steam jackets to prevent freezing by gas expansion. The jackets were fabricated at the plant. Steam jackets also enclose the ¼-in. pressure-control lines of the high-pressure-reducing valves.

Rich oil from the primary (high-pressure) flash tank is preheated in exchange of heat with hot lean oil, and then flashed again in a secondary surge tank held under pressure of 175 lb. This vessel is fitted with a liquid-level control at the discharge end, a back-pressure regulator on the vent line.

In addition to the rich oil, any condensate or other products in storage which operators desire to reprocess can be returned to the system at this point through a separate inlet line which has been provided from the tank-battery manifold. On this line is a 6-in. by 4-in. by 6-in. steam-driven reciprocating rerun pump.

(Continued on Page 32)

Development, Operation and Valuation of Oil and Gas Properties—Part 7

Flow of Gas-Oil-Water Mixtures Through Media Of Uniform Permeability

By PARK J. JONES
Petroleum Engineer, The Texas Company

The technique developed by Sage and Lacey under Research Project 37 of the American Petroleum Institute is rapidly becoming routine practice for determining fundamental data on gas-oil mixtures. In this installment Mr. Jones shows how the volume factors determined by the Sage-Lacey method can be used to make accurate estimates of oil recovery by either gas expansion or water drive. This contribution, prepared especially for The Oil and Gas Journal by Mr. Jones, has never before been available to the industry.

1. *The volume factor.*—In mapping out saturations of virgin oil reservoirs, it is convenient to apply volume factors. The volume factor is the space occupied by 1,000 cu. ft. of gas or by 1 bbl. of oil and its associated gas under reservoir conditions. Volume factors are important dependent variables and will be given detailed consideration on subsequent pages. In this section only the numerical values of the volume factors for virgin oil reservoirs are noted.

Nearly all crude-oil accumulations when first penetrated by a well bore contain gas in solution. Exclusive of condensate reservoirs and gas caps, the volume factors for most crude oils under reservoir conditions and original saturation pressure fall within the limits $1 < b \leqq 2$ where b equals the space occupied by a barrel of oil and its solution gas expressed in bbl./bbl. under the conditions of reservoir temperature and virgin bubble-point pressure.

2. *Saturation.*—For $1 < b \leqq 2$ and $10 \leqq S_w \leqq 60$ as the limiting values of volume factors and interstitial water respectively at virgin bubble-point pressure; the space occupied by solution gas, oil, and water in per cent of porosity may be mapped out as indicated in Fig. 16. On the other hand, if

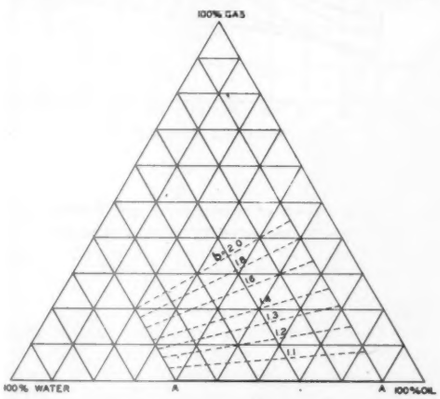


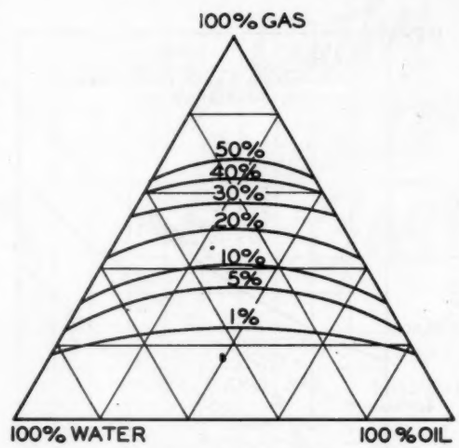
Fig. 16—A method of mapping saturation of virgin oil reservoirs. Per cent of porosity

the space occupied by gas in solution is assumed to be oil, the saturation of virgin oil reservoirs may be represented by the line A—A.

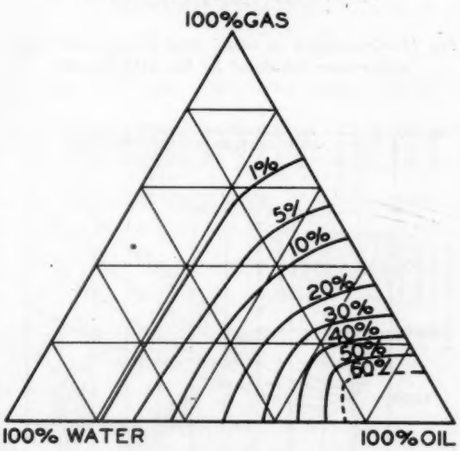
Upon reduction of reservoir pressure to less than the virgin bubble-point value, some solution gas evolves and the total space occupied by oil plus gas remaining in solution plus free gas is greater than b. The free gas reduces the effective permeability to oil. The influence of three phases on the effective permeabilities of porous media was investigated by Leverett and Lewis.[1] Their observations are here briefly reviewed.

3. *Effective permeability.*—Working with unconsolidated sands of uniform permeability ranging from 5.4 up to 16.2 darcys, Leverett and Lewis[1] observed: (1) that effective permeability to gas, oil, and water is independent of oil viscosity; (2) that the effective permeability to water is a function of water saturation only; (3) that the effective permeability to gas in three-phase flow is slightly less than it is for the same gas saturation in two-phase flow, see Fig 17(*a*); (4) that the

(Continued on Page 39)

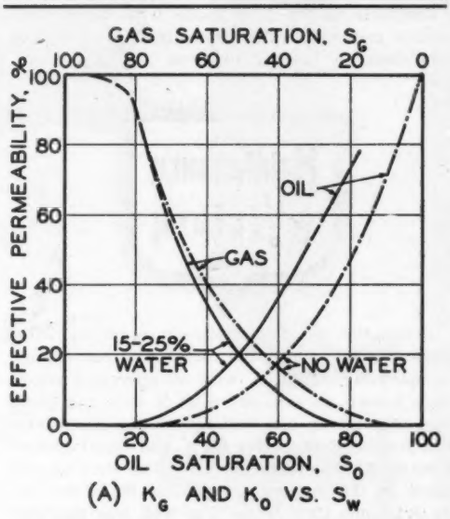


(A) $K_g = \Phi\ (S_o,\ S_g,\ S_w)$
Curves indicate effective permeability to gas in per cent of specific permeability.

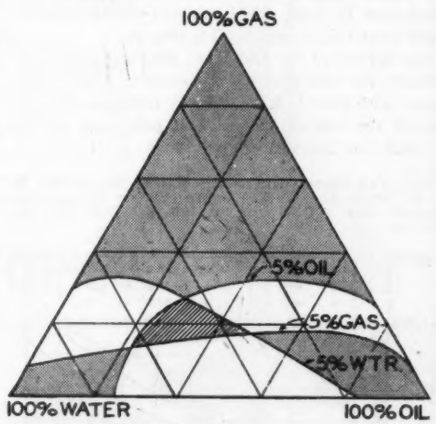


(B) $K_o = \Phi\ (S_o,\ S_g,\ S_w)$
Curves indicate effective permeability to oil in per cent of specific permeability

Fig. 17—Effective permeability vs. saturation (after Leverett and Lewis, A.I.M.E.)



Arrows point to increasing fractions of produced gas, oil and water.



LEGEND
Essentially one phase flowing.
" two " "
Appreciable flow of all three phases.

(B) Approximate limits of saturation producing 5 per cent or more of gas, oil, and water

Fig. 18—Relative effective permeability and composition of production vs. saturation (after Leverett and Lewis, A.I.M.E.)

Calculation of Load and Stroke In Oil-Well Pump Rods (Part 2)

By B. F. LANGER and E. H. LAMBERGER
Westinghouse Research Laboratories

In the first installment, appearing in the July 2, 1942 issue, the authors presented nomenclature and developed formulas. In this second and final installment, the application of formulas to operating conditions is discussed with special reference to field tests as well as to effects of some operating conditions and well depth on peak polished-rod loads. The paper was delivered before the national meeting of Applied Mechanics Division, American Society of Mechanical Engineers, Cambridge, Mass., June 19-20.

THE value of any formula is, of course, determined by its close prediction of values that will occur in actual operation. It is very important, however, that all conditions pertinent to the accurate prediction of actual loads be known during any confirming tests made and be represented in the formula. Also any simplification of a complete formula must include compromises, which necessarily requires caution when applying such a simplified formula to abnormal conditions.

Comparisons are here made with actual test results and with calculations made for several conditions not covered by tests.

Description of field tests.—In order to determine how pumping loads varied with one change in operating condition, with all operating conditions known, an exhaustive set of tests was made cooperatively on one well by Phillips Petroleum Co., Sargent Engineering Corp., and Westinghouse Electric & Manufacturing Co.* The well was located on the property of Phillips Petroleum Co. in Oklahoma City, Okla. The well was specially selected. It was an abandoned, "dead" well, quite straight, quite constant as to casing fluid level, with fluid being chiefly salt water (specific gravity 1.04) with only a trace of oil. The tests were conducted in such a way as not to disturb the fluid level to any appreciable degree.

The layout of the test well, indicating the locations of the test devices, is shown in Fig. 1, published with Part 1, last week. (A complete description of the test equipment was published in The Oil and Gas Journal, May 7, 1942, p. 41).

*Oil Well Tests Suggest New Rating Standards," by H. E. Dralle and E. H. Lamberger, The Oil and Gas Journal, Nov. 6, 1941, pp. 98, 101, 102, 104, 107, 108, and 110.

Tests were made under a variety of operating conditions, including three prime movers, rotary and beam counterweights, three plunger sizes, and two sizes of tubing, at four different surface strokes and four speeds.

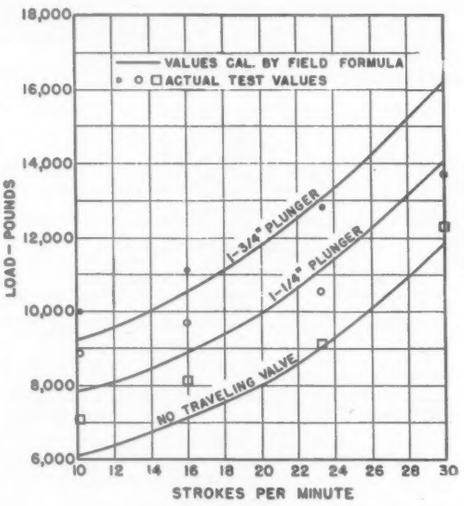


Fig. 13—Comparison of actual peak polished-rod loads with values calculated by the field formula
(3,500-ft. string; 2,250-ft. fluid head; ¾-in. rods)

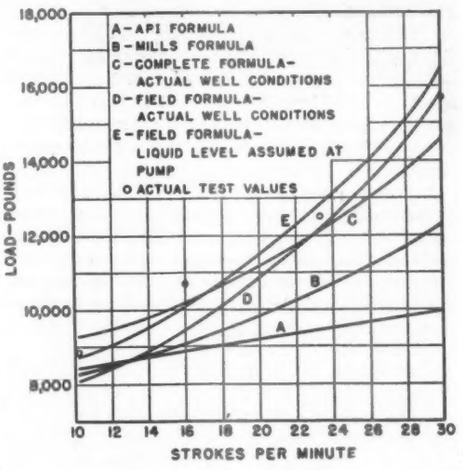


Fig. 14—Comparison of actual peak polished-rod load with values calculated by various formulas
(3,500-ft. string; 2,250-ft. fluid head; ¾-in. rods; 1¼-in. plunger; 53-in. polished-rod stroke)

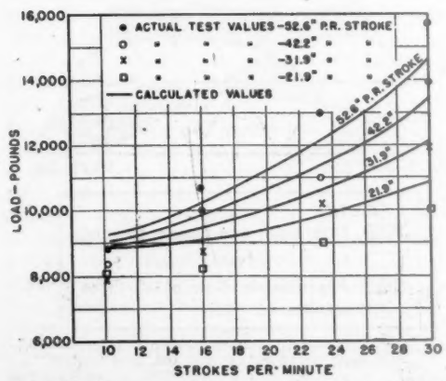


Fig. 11—Comparison of actual peak polished-rod loads with values calculated by complete formula
(3,500-ft. string; 2,250-ft. fluid head; ¾-in. rods; 1¼-in. plunger)

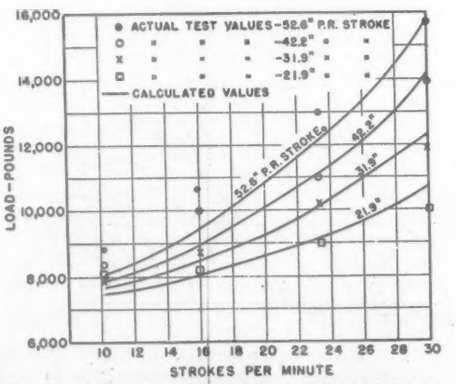


Fig. 12—Comparison of actual peak polished-rod loads with values calculated by the field formula
(3,500-ft. string; 2,250-ft. fluid head; ¾-in. rods; 1¼-in. plunger)

Comparison of calculated with actual peak polished-rod loads.—Figs. 11 and 12 compare values of peak polished-rod loads, calculated by the complete (Equation 14) and field formulas (Equation 16), respectively, with actual test values. The field formula gives results which are equal to or greater than actual values at the high speeds but are somewhat lower at the low speeds. The results obtained from the complete formula are somewhat lower than actual values at the higher speeds and somewhat high at the lower speeds. The high values at the low speeds obtained from the complete formula result from the assumption that the fluid load is suddenly applied, while actually at the low speeds the load assumption by the plunger is no doubt gradual. While there is a difference in degree of slope of the two sets of calculated results, it is important to note that the deviation of either calculated curve, for any stroke length, from the corresponding curve of actual results never exceeds 10 per cent.

Fig. 13 compares values calculated by the field formula with test results for two different plunger sizes and a third plunger with the traveling valve removed. Here again, deviations of the calculated curves from the curves of actual values approximate 10 per cent.

Comparison with existing formulas for peak polished-rod load.—While many formulas have been proposed for calculating peak polished-rod load, two commonly used formulas mentioned previously in this paper are:

1. The American Petroleum Institute formula

$$PPRL = (W_R + W_r)\left[\frac{1 + SN}{5{,}400}\right]$$

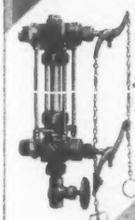
2. The Mills formula

$$PPRL = W_r + W_R\left(1 + \frac{SN^2}{70{,}500}\right)$$

QUALITY UNCOMPROMISED

Automatic Injector

Ejector, Syphon or Jet Pump


"Navy Type" Liquid Level Gage

"Safeguard" Automatic Liquid Level Gage

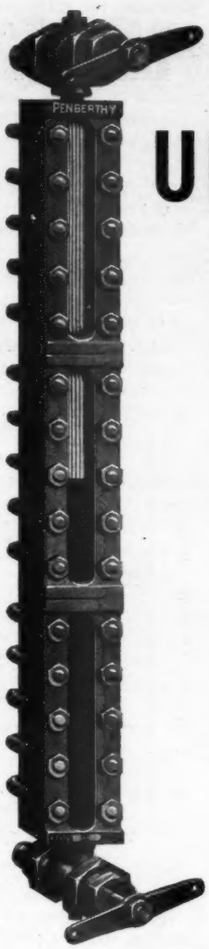
"All-Iron" Automatic Liquid Level Gage

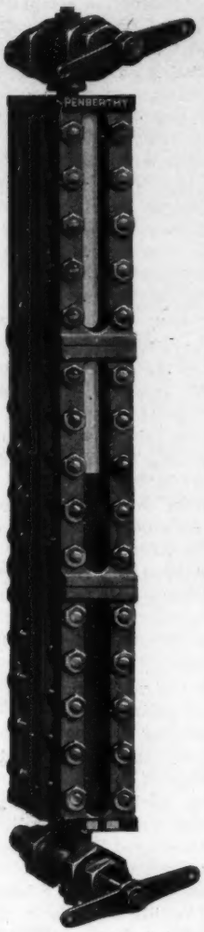
Gas Engine Lubricator

Snap Lever Oiler

Plain Brass Oil Cup

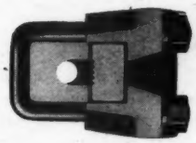
Plain Compression Grease Cup





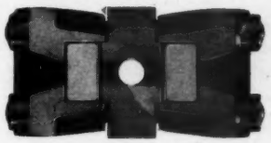
PENBERTHY *Reflex* DROP FORGED STEEL LIQUID LEVEL GAGES

Liquid shows black — empty space shows white. Preferred wherever liquid level must be easily and positively visible . . . and when liquids are under high pressure or at high temperature.



PENBERTHY *Transparent* DROP FORGED STEEL LIQUID LEVEL GAGES

Used to observe color and density of liquids under high pressures, and/or temperatures. Construction is exceptionally rugged . . . similar to Reflex types.



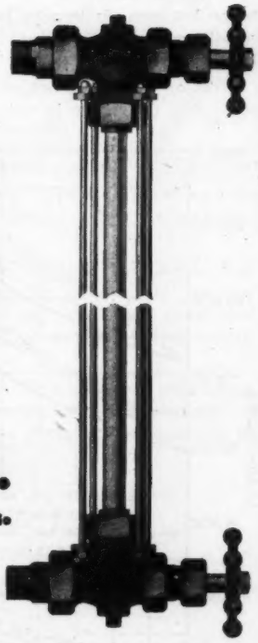
Penberthy Liquid Level Gages

PENBERTHY *Reflex* WATER GAGE SET

Water shows black — steam shows white. U-Bolt construction is strongest and simplest to service. Glass replaced by simply removing nuts on face of gage . . . unnecessary to work between gage and boiler.

PENBERTHY DROP FORGED STEEL LIQUID LEVEL GAGES

Made of Chromium-molybdenum alloy temperature-resisting steel, extra heavy throughout. Stainless steel trimmed tubular glass type gages also available in various other metals suitable for practically all conditions.



PENBERTHY INJECTOR CO.

DETROIT, MICHIGAN • Canadian Plant; Windsor, Ontario

PENBERTHY PRODUCTS

Screw Plunger Grease Cup

Spring Compression Grease Cup

Automatic Electric Sump Pump

Automatic Cellar Drainer (Water or Steam Operated)

Dipless Air Cock

Fig. 14 affords a comparison of these formulas with actual values and with the new formulas proposed herein. It is apparent that neither of the existing formulas predicts an increase in load with increase in speed which is as great as the actual rate of increase. The increase obtained with the Mills formula is more nearly correct than that obtained with the A.P.I. formula, because the Mills formula includes a factor for varying the force caused by rod acceleration as the square of the pumping speed. Mills ignores the fluid-acceleration force as negligible. It is practically negligible for the conditions indicated for Fig. 14, but for larger sizes of plunger this factor does become appreciable.

Both of these formulas assume a fluid head equal to the full depth to the pump, whether or not this is actually the case. In spite of this assumed greater than actual load, both formulas still give values below actual ones at all speeds in Fig. 14. The effect of this assumption on the load predicted is illustrated by the difference between the two curves calculated by the proposed field formula; one based on actual conditions (*C*), the other assuming the casing liquid level at the pump (*D*). It is evident that, if the true liquid level were used with the existing formulas, the margin by which they fall short of predicting the actual load would be increased considerably.

Effect of variation in some operating conditions on peak polished-rod loads.—While a wide variety of operating conditions was covered in the tests made, the tests were limited to a single well, and the range of conditions by no means included all possible variations encountered in actual practice. The question naturally arises how accurately the proposed formulas would predict loads and displacements for conditions other than those covered in the tests. While no comparison with actual results is available, calculations have been made for a few conditions. They do afford a comparison between the various formulas and aid in establishing the limits of applicability of the simplified field formula.

The effect of stepped string on peak polished-rod loads.—The difference in natural period of a stepped-rod string as compared to a uniform-rod string is reflected in the magnitude of the force due to rod-string acceleration. Equation 10 gives the formula for calculating the natural frequency of a three-stepped string (a string using three rod sizes) and Equation 11 gives the formula for calculating the natural frequency of a two-stepped string (a string using two rod sizes). Calculations of peak polished-rod loads involving natural frequency of the rod string must be made according to the complete formula, as the simplified field formula eliminates this refinement.

Fig. 15 shows results calculated for a two-stepped string, for any proportioning of the two sizes of rods, using both the true natural frequency from Equation 11 and the natural frequency of a uniform string. The greatest variation occurs with equal length of the two rod sizes. With a 3,500-ft. string and a 2,250-ft. fluid head, the total peak polished-rod load based in the natural frequency of a uniform string is only 3 per cent above the total load calculated by using the natural frequency of the stepped-rod string. For a 6,500-ft. string with a 4,500-ft. fluid head, the difference is 4.5 per cent. Similar calculations made for a 6,500-ft. string with three steps of rod sizes, ¾-in., ⅞-in., and 1-in., of equal length, and with operating conditions the same as indicated in Fig. 15, for the 6,500-ft. string with 4,500-ft. fluid head, give peak polished-rod loads which differ by 7.7 per cent. This indicates even greater differences for an increased number of steps. However, for present well depths, rod strings with more than three steps are unusual.

In all cases, the results using the natural frequency for a uniform rod string are greater than those obtained when using the stepped natural frequency. Thus, calculations neglecting the stepped frequency and using the frequency of a uniform string will give results which form a safe basis of application.

Effect of well depth on peak polished-rod loads.—In eliminating the consideration of the damping factor in the field formula, limitation in application of this formula is introduced. Fig. 16 shows peak polished-rod loads calculated by both formulas for three well depths, namely 7,500 ft., 5,500 ft., and 3,500 ft., over a range of pumping speed from 10 to 30 strokes per minute.

Calculations by field formula for the 7,500-ft. well at 30 strokes per minute result in a load approaching infinity. This should be the case, since 30 strokes per minute pumping with this length of rod string closely approaches a resonant condition. While such a speed with a 7,500-ft. string would not be attempted in practice, it must be recognized that the over-all damping of the well plays a very important part in permitting even reasonably high speeds with the long strings without resulting in excessive peak rod loads. Probably 20 strokes per minute pumping with a 7,500-ft. string would not be exceeded in regular practice. Fig. 16 shows that, at this speed, the field formula gives a value only 14.3 per cent higher than calculated with the complete formula. The difference in results of the two formulas reduces quite rapidly so that, at 18 strokes per minute, the load by field formula exceeds that by complete formula by only 6.5 per cent. With the 5,500-ft. string, loads calculated by the field formula are finite at even 30 strokes per minute, though they are considerably greater, as is to be expected, than values calculated by the complete formula. At practical pumping speeds, the differences between the two sets of results are of approximately the same percentage as for the 7,500-ft. string.

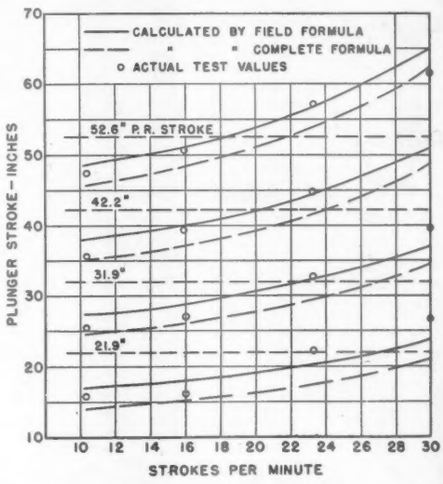


Fig. 17—Comparison of actual plunger stroke with values calculated by field and complete formulas
(3,500-ft. string; 2,250-ft. fluid head; ¾-in. rods; 1¼-in. plunger)

For a 3,500-ft. string, both formulas agree quite closely with actual test values over the entire range of speeds from 10 to 30 strokes per minute. Actual test results with a 4,500-ft. string of rods, and with other conditions as indicated in Fig. 16 for the 3,500-ft. well, were obtained at a few speeds. At 16.5 and 24 strokes per minute, the values calculated by field formula were, respectively, 8 per cent below and 3.5 per cent above actual test values.

In using the complete formula to derive the curves shown in Fig. 16, it was of course necessary to determine values of damping factor for the long rod strings. This was done by increasing values determined by test for the 3,500-ft. string in proportion to the increase in string length, in accordance with Equation 2*a*.

Plunger-stroke comparisons.—Fig. 17 affords a comparison between test results and values calculated by both the complete Equation 15*a* and the field formulas Equation 17 for plunger strokes proposed in this paper. As the complete formula gave results which seemed to be con-

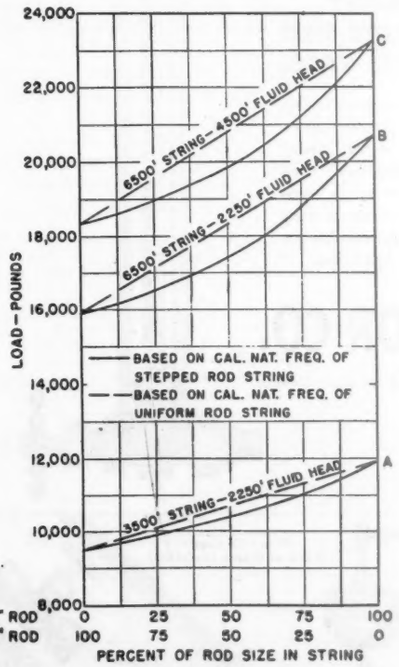

6500' STRING—4500' FLUID HEAD
6500' STRING—2250' FLUID HEAD
3500' STRING—2250' FLUID HEAD
BASED ON CAL. NAT. FREQ. OF STEPPED ROD STRING
BASED ON CAL. NAT. FREQ. OF UNIFORM ROD STRING
LOAD—POUNDS
7/8" ROD
3/4" ROD
PERCENT OF ROD SIZE IN STRING

Fig. 15.—Effect of stepped rod string on peak polished-rod loads, calculated by complete formula
(⅞-in. and ¾-in. rods; 1¼-in. plunger; 42.6-in. polished-rod stroke; 20 strokes per minute)

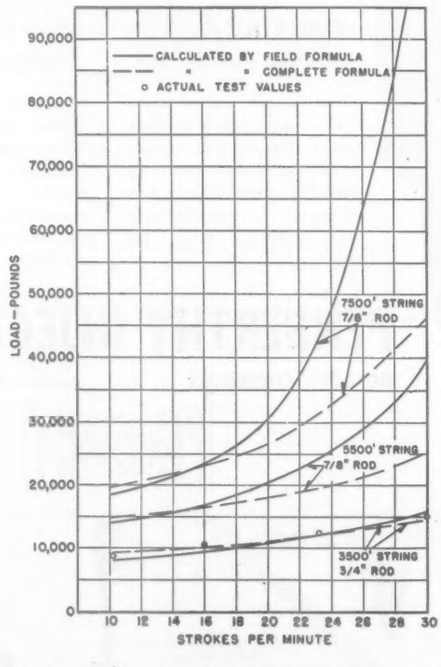


Fig. 16—Calculated peak polished-rod loads for various depths
(2,250-ft. fluid head; 1¼-in. plunger; 53-in. polished-rod stroke)

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sistently lower than test values, modifications were incorporated in the field formula which raised the values to make them more closely agree with the actual results. These modifications were made in the constants in that part of the formula which corrects for rod and tubing stretch. This method tends to result in a constant difference between curves at normal speeds. At speeds which are high for any string length, the first term of the field formula, involving the expression Cos $(0.002\ LN)^\circ$ in the denominator, will obviously digress widely from the first term of the complete formula, the denominator of which is the factor R. Since this factor R depends upon the value of the damping factor, it is obvious that, for abnormal combinations of string length and speed of pumping, it is necessary to use the complete formula. This is further illustrated in Fig. 18, which compares values calculated by the two formulas for three different well depths over a pumping-speed range from 10 to 30 strokes per minute. This figure also shows results calculated by Rieniets' formula,* for the 3,500-ft. well.

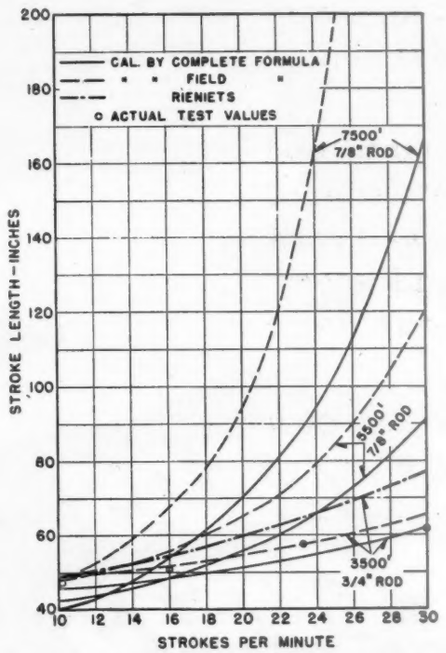

Fig. 18—Calculated plunger strokes for various depths (2,250-ft. fluid head; 1¼-in. plunger; 53-in. polished-rod stroke)

Summary and Conclusions

Peak polished-rod loads and effective plunger strokes in an oil well can be calculated by using the following formulas:

1. Complete formula for peak polished-rod load

$$\text{PPRL} = W_R\left[1 + \frac{ESK_1}{288L\delta_o}\right] + W_o\left[\frac{E_o\omega S_P}{144a_oL\delta_o}\right] + 2W_{oD} - W_{Rb}$$

2. Field formula for peak polished-rod load

$$\text{PPRL} = W_R - W_{Rb} + W_{oD} + 0.75SN\ [17A_R \tan (0.0004LN)^\circ + A_o]$$

3. Complete formula for effective plunger stroke

$$\text{EPS} = \frac{S}{R} - \frac{24LW_{oD}}{E}\left[\frac{1}{A_R} + \frac{1}{A_T}\right]$$

4. Field formula for effective plunger stroke

$$\text{EPS} = \frac{S}{\cos (0.0004LN)^\circ} - \frac{W_oL_D}{2(10^6)}\left[\frac{1}{A_R} + \frac{1}{A_T}\right]$$

The strokes and areas are expressed in inches, forces and weights in pounds, the well depth L in feet, and the pumping speed N in strokes per minute. These dimensions are commonly used in the oil fields. Values of K_1 are found in Figs. 4 and 5, and values of $1/R$ are found in Fig. 3.

The results calculated by the foregoing formulas agree closely with test values obtained from a comprehensive test program, carefully carried out on a single well. It is believed that data determined by tests made with similar care on wells at other depths, or under other operating conditions, will also closely agree with calculated values. Such comparisons are invited.

Acknowledgment

The authors wish to express their appreciation to Messrs. W. L. Kitsman and W. C. Rodgers of Phillips Petroleum Co.; R. W. Rieniets of the Sargent Engineering Corp., and C. J. Tirk of the Westinghouse Electric & Manufacturing Co., with whom the authors were associated in the active conduct of the tests; also to W. H. Dauberman of Westinghouse who did a major portion of the calculations and reduction of data.

Appendix 1

Acceleration of Fluid Column

We wish to find the force exerted by the plunger on the fluid column, if the column starts from rest and the plunger moves up with a motion represented by the function $S_P/2\ (1 - \cos \omega t)$. We are interested only in the first half cycle of plunger motion. We may consider the fluid column as a rod supported at the bottom. Fig. 19.

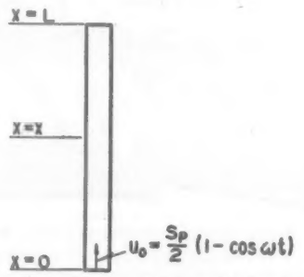

Fig. 19—Simplified fluid column under forced vibration

Let the symbols be the same as given in the nomenclature and throughout the paepr, except that the subscript 0 will refer to physical constants of the fluid column. At $x = 0$

$$u = \frac{S_P}{2}\ (1 - \cos \omega t)$$

This motion starts a compression wave moving up the column which travels with a velocity a_o. Therefore at $x = x$

$$u = \frac{S_P}{2}\left[1 - \cos\ \omega\ (t - \frac{x}{a_o})\right]$$

$$\frac{\partial u}{\partial x} = -\frac{S_P\omega}{2a_o} \sin\ \omega\ (t - \frac{x}{a_o})$$

The first reflection of this strain wave is from the open top end and is

$$\frac{S_P\omega}{2a_o} \sin\ \omega\ (t - \frac{2L - x}{a_o})$$

The second reflection is from the fixed bottom and is

$$\frac{S_P\omega}{2a_o} \sin\ \omega\ (t - \frac{2L + x}{a_o})$$

third reflection

$$-\frac{S_P\omega}{2a_o} \sin\ \omega\ (t - \frac{4L - x}{a_o})$$

fourth reflection

$$-\frac{S_P\omega}{2a_o} \sin\ \omega\ (t - \frac{4L + x}{a_o})$$

At the plunger $x = 0$ and the force is

$$\frac{A_oE_oS_P\omega}{2a_o}\left\{-\sin\ \omega t - 2\sum_{s=s}^{s=i}\left[\sin\ (\omega t - \frac{2s\omega L}{a_o}) (-1)^s\right]\right\}$$

We are interested in the maximum value of this expression during the interval $0 < t < \pi/\omega$. This depends upon how many reflections have time to return to the plunger from the top of the well. The first reflection arrives at $t = 2L/a_o$ and the next at $t = 4L/a_o$, etc. If $2L/a_o > \pi/\omega$, no reflections reach the plunger at all during the upstroke. If $4L/a_o > \pi/\omega$, only the first reflection reaches the plunger, and since this is opposite to the initial wave, it decreases the force. Therefore if $4L/a_o > \pi/\omega$ the maximum possible force is

$$\frac{A_oE_oS_P\omega}{2a_o}$$

Since $W_o = A_oL\delta_o$, this can be written

$$\frac{W_oE_oS_P\omega}{2a_oL\delta_o}$$

For the test well, with a depth of 3,500 ft., $4L/a_o = \pi/\omega$ at about 10 strokes per minute, and the operating range was 10 to 30 strokes per minute. Therefore, the reflections need not be considered in calculating the peak plunger force. For deeper wells, the speed would have to be even lower than 10 strokes per minute before the reflected waves would increase the plunger force

Appendix 2

Natural frequency of stepped rods.—For considering the effect of changes in cross section on the natural frequency, it is not necessary to consider damping. The differential equation of the

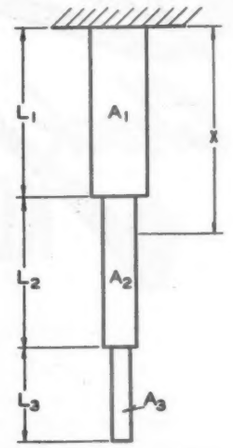

Fig. 20—Three-step rod string

system, shown in Fig. 20, is Equation 1 with $n = 0$, or

$$\frac{\partial^2 u}{\partial t^2} = a^2\frac{\partial^2 u}{\partial x^2} \qquad (18)$$

Assume a solution of the form $u = X(C_1 \cos pt + C_2 \sin pt)$. Substituting this in Equation 18,

*"Plunger Travel of Oil Well Pumps," by R. W. Rieniets, A.P.I. Drilling and Production Practice, 1937, pp. 159-78.

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we obtain a differential equation in X and x, the solution of which is

For $0 < x < L_1$, $X = C_2 \cos \frac{px}{a} + C_4 \sin \frac{px}{a}$ (19)

For $L_1 < x < L_1 + L_2$, $X = C_5 \cos \frac{px}{a} + C_6 \sin \frac{px}{a}$ (20)

For $L_1 + L_2 < x < L_1 + L_2 + L_3$, $X = C_7 \cos \frac{px}{a} + C_8 \sin \frac{px}{a}$ (21)

The end conditions are

$$\text{at } x = 0,\ u = 0$$

$$\text{at } x = L_1 + L_2 + L_3,\ \frac{\partial u}{\partial x} = 0$$

at $x = L_1$, u from Equation 19 $= u$ from Equation 20

at $x = L_1 + L_2$, u from Equation 20 $= u$ from Equation 21

at $x = L_1$, $A_1\ (\partial u/\partial x)$ from Equation 19 $= A_2\ (\partial u/\partial x)$ from Equation 20

at $x = L_1 + L_2$, $A_2\ (\partial u/\partial x)$ from Equation 20 $= A_3\ (\partial u/\partial x)$ from Equation 21.

These six end conditions, when substituted into Equations 19, 20, and 21, result in a set of equations from which the following expression can be derived:

$$\frac{\frac{A_1}{A_2}\tan\frac{pL_2}{a} + \tan\frac{pL_1}{a}}{\frac{A_1}{A_2} - \tan\frac{pL_1}{a}\tan\frac{pL_2}{a}} = \frac{A_3}{A_2}\cot\frac{pL_3}{a} \quad (22)$$

This is the "frequency equation" for the string with three rod sizes.

If $L_3 = 0$, the right side of Equation 22 becomes infinity, which requires that the denominator of the left side $= 0$, then

$$\tan\frac{pL_1}{a}\tan\frac{pL_2}{a} = \frac{A_1}{A_2} \quad (23)$$

This is the "frequency equation" for the string with two rod sizes.

If $L_2 = L_3 = 0$, $\tan\frac{pL_1}{a} = \infty$, $\frac{pL_1}{a} = \frac{\pi}{2}$

or

$$p = \frac{\pi a}{2L_1} \quad (24)$$

from which we obtain the well-known result that the lowest natural frequency of a uniform rod fixed at one end is $a/4L_1$.

Minimum Use Made of Critical Materials in Building Plant

(Continued from Page 24)

Utilization is made of the hot still vapors in heat exchange for further preheating of the rich oil stream. This not only provides another means of reducing duty of the steam preheater for final heating of the rich oil stream to the still, but also serves for initial cooling of the hot vapors. Comparatively little additional heating is required in the steam preheater to raise the temperature of the rich oil stream to 395° F., the still feed temperature.

The still is a 30 by 40-ft. vessel, equipped with 16 bubble trays. The rich oil is fed sidestream to the still. A top temperature of 310° F., controlled by reflux circulated from the still reflux accumulator, insures stripping of the absorbed gasoline and lighter fractions.

Bottoms carrying the absorption oil and absorbed heavy condensate fractions are drawn off the reboiler instead of the base of the still proper as is customary operation of most plants. Cooled in exchange of heat with the cold rich oil stream, this oil feeds the absorption-oil circulating system, and normally also provides an excess which is drawn off to be marketed as diesel fuel.

Stabilizer feed is taken directly off the still reflux accumulator. Pressure is controlled from a single point. A back-pressure regulator on the stabilizer reflux accumulator is maintained through the entire processing system to provide continuous flow. The pressure now held is 115 lb. which exists not only on the stabilizer but also on the still and back to the discharge of the secondary flash tank.

The still reflux accumulator is an 8-ft. by 32-in. vessel. Condensed still vapors enter at a temperature of 170° F. Fluid level is maintained by a liquid-level control, the stabilizer feed being flashed overhead sidestream to the stabilizer column. The accumulator is equipped with a bottom water drawoff, from which water and steam condensate accumulation is taken from the system and returned to boiler feed. The reflux stream to the top of the still is circulated by a 3-in. by 2-in. centrifugal pump driven by a 2-hp. explosionproof motor.

The stabilizer tower is 62 ft. in height with 30 bubble trays. The lower section is 30 ft. by 49 in. and the top 32 ft. by 3 ft. A steam-heated reboiler is installed in the lower section. The reflux accumulator is an 8 by 32-in. vessel equipped with a liquid level control in the base with a back-pressure regulator controlling the back pressure on the entire distillation system, on the accumulator vent line to the flare. Condensation of reflux is by means of a water-cooled tube and shell partial condenser installed on the vapor line from the stabilizer.

In present operation, temperature of 110° F. at the top and 290° F. at bottom is maintained in the stabilizer. The top is controlled by reflux circulated by an electrically driven centrifugal pump, identical to the still reflux pump. A 400 end-point motor fuel is obtained from the stabilizer bottoms. Fluid level in the column is controlled by a float-operated dump valve which discharges the product through an 11-bank water-tube cooler to storage.

Production Accurately Metered

Reflux vapors flashed in the stabilizer reflux accumulator are vented to the flare. The condensate processed contains very little butane, not to mention lighter fractions, and consequently the gas vented at this point is small. Total flare gas, including the stabilizer reflux vapors and the flash gas from the secondary flash tank, amounts to less than 2 per cent of the total gas processed. The only other gas not returned to the producing sand is the fuel gas taken off the primary flash tank, and a comparatively small volume withdrawn from the high-pressure absorber residue gas line for gas sales.

Due to division of production, all flow, both gas and liquid, is accurately metered. Inlet gas-distillate production from the field is recorded by a flow meter on the plant inlet line ahead of the main pressure-reducing regulators. Other meters are placed on the stabilizer reflux gas to the flare, other flare gas, fuel gas, lean-oil circulation to the high-pressure absorber, the rich oil stream to the still, and on each injection well.

Steam for plant operation is generated by three 125-hp., 300-lb. working pressure, oil-field-type boilers. These are equipped both with automatic feed-water and fuel controls. Through efficient utilization of heat exchange in preheating, steam requirements have been minimized. Steam for heating is used in the stabilizer and still reboilers, rich-oil final preheater, and for jackets on high-pressure regulator valves and meter lines. Steam-operated pumps include two 10-in. by 3½-in. by 10-in. boiler-feed pumps, two 6-in. by 4-in. by 6-in. rerun and transfer pumps, and two turbine-driven centrifugal pumps for cooling-water circulation. Steam also is used for a turbine driving a 16-kw., 20-kva., 220-volt, 1,800 r.p.m. generator supplying the plant's electrical power. All process steam is condensed and run to the hot well for boiler feed water.

Electric power is used for the still and stabilizer reflux pumps, each being a 3-in. by 2-in. centrifugal unit driven by a 2-hp. explosionproof motor; a two-stage air compressor, belt driven by a 3-hp., 220-volt, three-phase, 60-cycle motor, and the deep water-well pump.

The plant has a single water system for cooling purposes. The water is circulated continuously from the concrete basin of the cooling tower through engine jackets, coolers and condensers back over sprays in the top of the tower. The tower is 16 ft. by 68 ft. by 40 ft. Makeup water is supplied from a 424-ft. well with pumping capacity of 60 g.p.m.

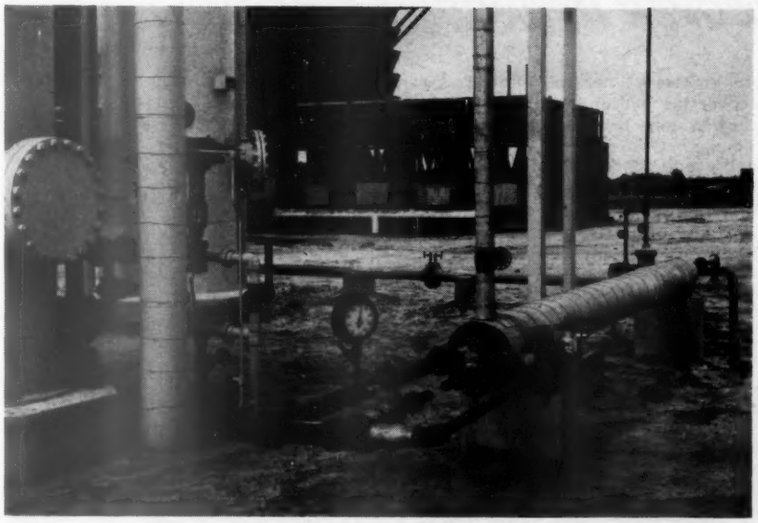
Two 600-hp. gas-engine compressors which return residue to the producing horizon at 3,450-lb. pressure

Refinery IDEAS ... that save $ $ $

Cool Light-Oil Charge to Improve Pump Operation

The two centrifugal pumps in the foreground were originally installed to handle 400° F. end-point motor fuel as a split-stream reflux over a fractionator of low-pressure design. The bottoms from the column were to be fuel oil. Near the center of the column, a stripping section was to produce kerosene. In operation, however, it developed that the depropanizer was too small to remove all the propane from the fractionator feed so a revamping job followed. To perfect the set up without having to wait for columns, pumps, etc., a debutanizer was made out of the fractionator. The centrifugal pumps were not designed for the lighter hydrocarbons that had to be used for reflux; therefore, something had to be done to stop the butane liquid from vaporizing. A 4-in. pipe was welded over the pump suction header as a jacket. Butane was taken from the suction header through a ¼-in valve and expanded in the 4-in. jacket, chilling the liquid to the pump.

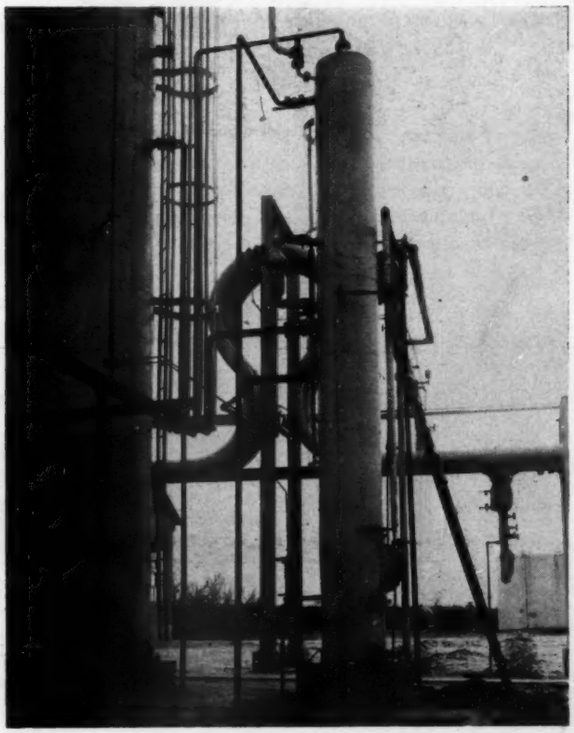
Expand High-Pressure Gas In Heated Compartment



Refinery or natural gas nearly always carried a trace of moisture which will freeze when the gas is expanded. This can be taken out by dehydration or the gas may be heated to equalize the cooling effect resulting from expansion. Shown here is a heater which was designed, comprising two 2-in. lines jacketed inside an 8-in. pipe. The gas is held at 1,600 lb. in one and released into the other at around 80 lb. Heat is supplied as steam at 240-lb. pressure inside the jacket at one end.

Two Fractionating Towers Set on A Single Foundation

Although the equipment shown in the right of the picture appears to be a single column, there really are two columns here, each 20 in. by 12 ft. and containing six bubble trays. The top compartment strips kerosene and operates at about 5-lb. pressure and at a bottom temperature of 430° F. This temperature is maintained by a hot-oil coil. Steam is not necessary in this particular instance because the kerosene feed (also reflux) has a 525° F. end point as it comes from the still or rectifier at 80-lb. pressure. Kerosene is drawn off the column through a liquid level control. The heavy fractions of gasoline are fractionated out overhead where they reunite with the debutanizer bottoms in the cooling coils. By laboratory tests it was found in this installation that the absorption oil used contained considerable paraffin, sludge and low-boiling fractions that would, in a short time, greatly reduce absorption efficiency. By taking the stripper (also reflux) feed from the hot-oil circulation header, it has been possible to get a feed temperature at 450° F. A hot-oil coil from the same source has been installed in the bottom of the stripper. Steam is added (at the bottom, just over the heating coil) in order to get the vapor load required. A 3-in. overhead vapor line is used to keep the pressure at a minimum. The heavy bottoms are drawn off manually into a drain line.



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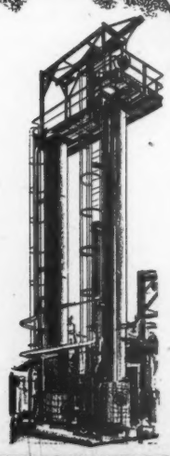

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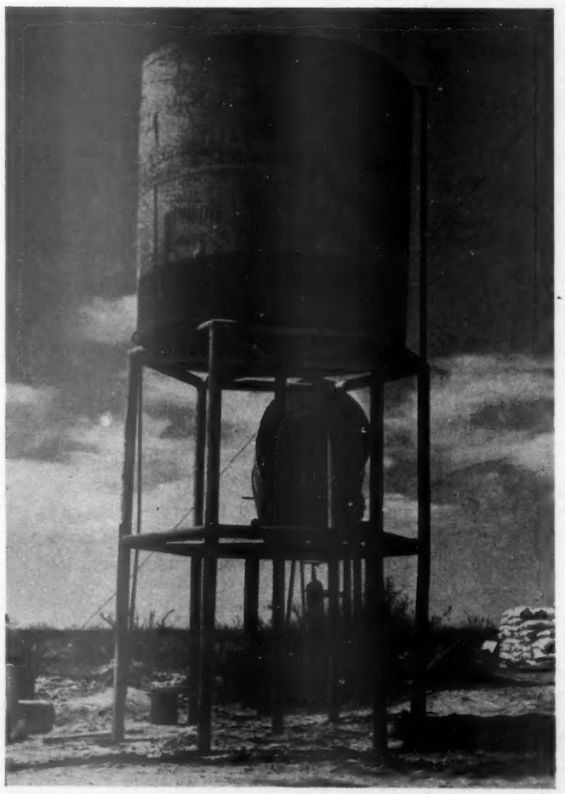
Operating Ideas

Canvas Cover For Servicing Unit

The crew of this servicing unit need not worry about snow in winter or the sun in the summer. A special frame built from old sucker rods supports the canvas used for a shed on the truck-mounted unit. Principal object is to keep mud and oil from flying from the wire line on to the machinery. Fence is needed around well because it is located in residential district.

Oil Drippings Prevented From Fouling Floor

On a Gulf Coast drilling barge, the derrick and engine floor is permanent, so a special effort is made to keep it clean. To prevent drippings from oil cans accumulating on the floor, the crew on one barge made a simple oil accumulator out of an old drum. The drum, open on top, is cut down to about a third of its size and set on three legs to permit cleaning underneath it. It has a wooden removable false bottom placed about 4 to 5 in. from the top, on which as a shelf, the oil cans, when not in use, are placed, allowing the drippings to drain through holes to the bottom of the drum. By removal of the false bottom, the oil accumulation in the bottom can be emptied when desired. As a barge rig is not torn down in moves, the container is never in the way.

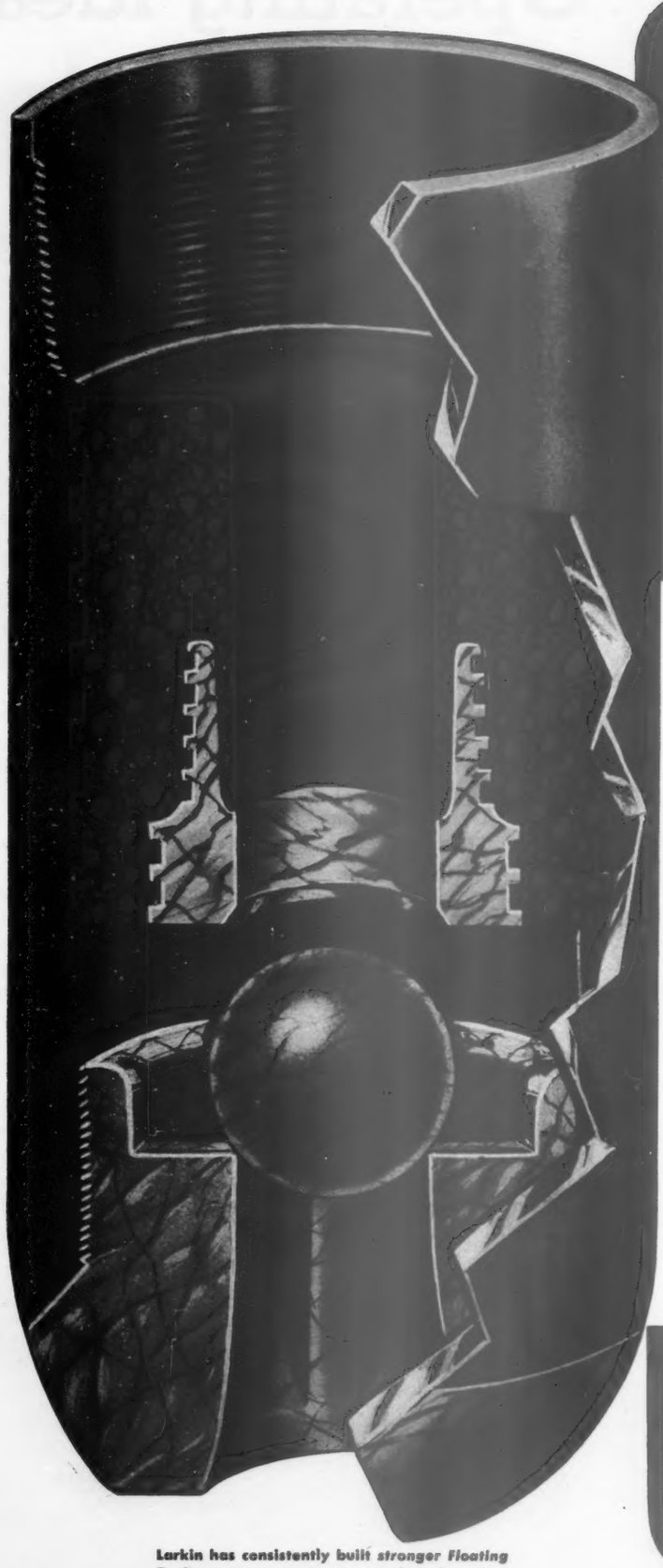


Support For Elevated Tank

Tanks used on drilling rigs for fuel and water must be elevated so that the fluid can flow by gravity. When using vertical tanks, the bottoms must be adequately supported. The photograph shows a method common in one area, the stand being built in a hexagonal shape and the bottom of the tank supported by cross members. A leg down the center also aids in the support.

Swing For Rod Line From Old Pipe

When one operator was unable to get a swing for a rod line he simply took the hub from an old bull wheel, some old 6-in. casing, and old elevator links and made the swing shown in the accompanying photograph. The two wells attached to the near post are balanced and the third well, which hooks on to the center post, helps balance the well supplying the power.



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Automatic Recording of Mud Weight Prevents Many Drilling Difficulties

DENSITY is one of the most important properties of drilling mud and should be carefully controlled. If it is too great in upper formations, there may be serious loss of circulation or there may be excessive wall cake formed that may stick drill collars and may interfere with the running of casing. At great depth, in many wells, it appears to be necessary to use mud of relatively high density to prevent small but serious incursions of gas, light petroleum, or salt water each time the bit is pulled up from the bottom. Control of mud density requires very close attention because of the irregularities introduced by scraping walls when making trips, by adding water without measurement, by adding weighting material at a varying rate, and many other causes.

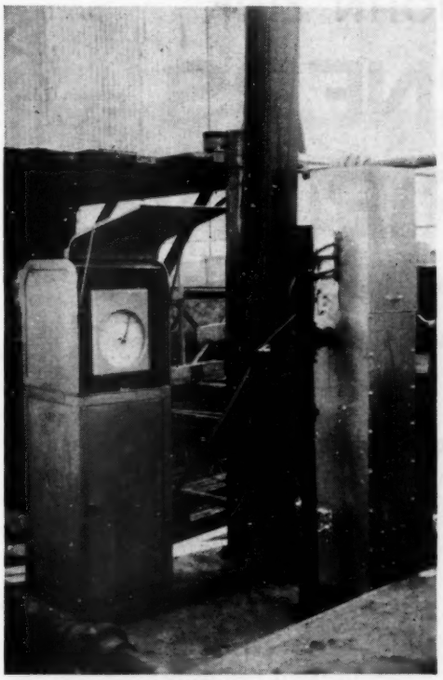
It has long been the custom of most Gulf Coast operators to require a record of mud density on every drilling report. And, most operators realize the importance of maintaining accurate control of mud weight in wildcats and difficult drilling operations. The general practice in the field is to check the mud at intervals of 15, 30, or 60 minutes, depending upon the practice of the operator, the field, and the depth. Yet there are always possibilities that significant changes of mud density may occur between these periodic checks that will not be observed or not be understood by the crews.

Need Automatic Record

This periodic checking is not done with any degree of regularity because of the many other duties assigned to the man responsible for the condition of the mud. Then there is the possibility of errors due to the human element involved. A mistake in reading the hydrometer or balance scale, or securing the mud sample may be a costly result. Failure to calibrate or make corrections on the hydrometer for every change in temperature of the water will cause errors of 0.2 lb. or more per gallon. It is not uncommon for an instrument to check accurately with water and yet be 0.2 to 0.4 lb. per gallon off at 14 to 15 lb. per gallon. By using the conventional method of measuring the mud weight, no "foolproof" record is available for future use and study. Because of lack of time or other reasons, the "mud man" may not record the mud weight at the specified time that it is supposed to be checked and recorded. It is an impossibility for the mud man to check the mud often enough that every light and heavy streak will be detected.

Considering the importance of maintaining the correct density and considering the typical costs for maintaining mud over 10.0 lb. per gallon, more complete recording of density appears definitely desirable. In abnormal areas where drilling is difficult and heavy mud is required, it is very essential that accurate measurements are made of the mud weight. The major item in the cost of mud is the weighting material used and because of this, every precaution should be used to minimize its addition. Considerable saving of weighting material can be had as well as a better equalized mud, if it is used only in the light streaks. Only with an automatic mud weighting and recording machine can the small heavy and light streaks in the mud be detected. By observing the duration of streaks of lighter or heavier mud, as recorded by an automatic device, it is much easier for the crews to tell when to start, how rapidly to add and how long to continue adding weighting material or water in order to equalize the density of all the mud in circulation.

In the Gulf Coast area, where wells are being drilled to 10,000 ft. and below, abnormal pressures are often encountered. To offset the pressures as depth in drilling wells is increased, the hydrostatic head created by the drilling fluid column must be increased with limitations. To do this requires very close supervision in order to prevent overweighting of the drilling fluid. By so doing, an operator can prevent an unnecessary increase in the cost of drilling, resulting from the excessive use of mud materials or by causing drilling difficulties which usually become expensive before they are overcome.



Above: Mud-weight-recorder installation on Gulf Coast drilling rig showing automatic recording instrument (left) and mud sampling and weighing machine (right). Connection from the weighing machine to the recording instrument box is by rubber hose which is easily uncoupled for moving the machine.

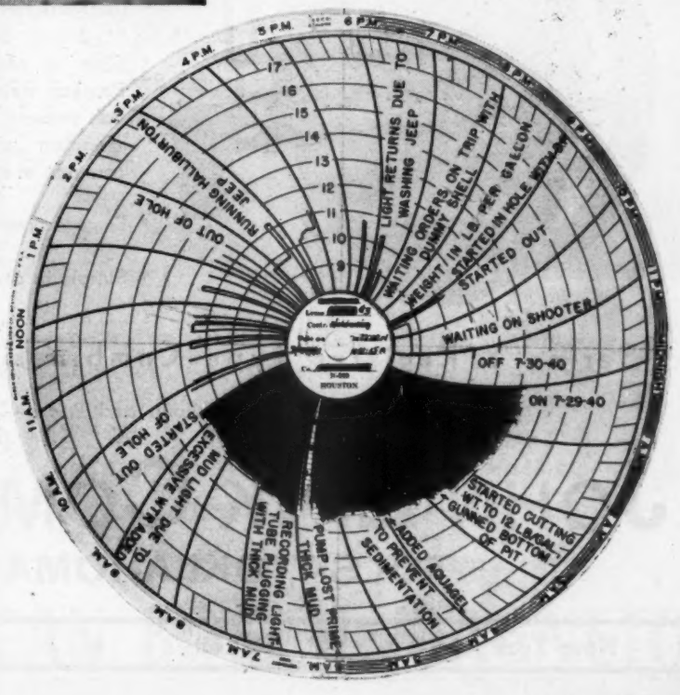


Fig. 1 (right) Field chart from mud-weight-recording machine showing complete mud-conditioning record of a well for 24 hours. Notations on the chart indicate other operations performed on the well incidental to mud conditioning. Chart was changed at noon.

Close Control Necessary

In localities where formations having unusually high gas pressures are liable to be encountered, the mud man's time becomes more limited. He must give more attention to the checking of mud conditions, testing and mixing of chemicals, addition of water or weighting materials, agitating or jetting of mud in the pits, each of which requires time. For these reasons, the necessity of knowing the weight of the mud at all times becomes more significant, the present time being the most important from the viewpoint of the personnel responsible for the drilling fluid's condition. The mud man must be ever on the alert to watch for the presence of gas in the drilling fluid. After a shutdown period, an intrusion of gas may occur and be present for only 10 minutes while circulating. Conventional methods of weighing mud may not detect this gas intrusion, but it is detected and recorded by the automatic device. The presence of gas must be carefully watched, and the mud conditioned in such a manner as to prevent this gas from causing trouble. Repeated occurrence may mean disaster. By the record produced by the automatic device, the mud man may anticipate a potential blowout, and can tell under such circumstances

whether any changes are occurring for better or worse.

In using heavy muds the possibility of a loss of returns is always present. If the pressure which the formation will stand is known, then care must be exercised never to exceed this pressure. Often a variation of only 0.4 lb. per gal. means the entrance of gas or salt water, or the loss of returns. Under such conditions, it is imperative that mud weight be known at all times.

Only when the man on the rig knows the exact condition of all the mud in the system and has that condition before him in recorded form, can he intelligently control his mud. Therefore, the ideal way of measuring the mud weight is with an automatic device which is not subject to the errors of the hydrometer and balance and which also furnishes a continuous permanent record. One instrument of this type receives a uniform sample from the flow line every 2 minutes and records the weight on a 24-hour circular chart. The principle of operation is the registration of the gas or air pressure required to overcome the hydrostatic head of a given column of mud, on a chart calibrated directly in pounds per gallon. This machine is simple in principle and does not depend on any delicate balance for its operation. It is entirely automatic and differences in weights of 0.1 lb. per gal. or less can quite easily be read on the chart record.

Mud-Conditioning Record

A field chart from this machine showing the mud conditioning record of a Gulf Coast well for 1 day is presented in the accompanying Fig. 1. Leading up to this chart, the record for the preceding day had shown a variety of mud conditions. The testing of the casing with water pressure had been completed and the bit has been run to the top of the plug. Drilling of cement was begun with water circulation, and the dirty water returns varied from 8.9 to 8.4 lb. per gal. When all but 5 ft. of the cement was drilled, circulation was changed from water to 10.6 lb. per gal. mud. This came back at 3:05 p.m. The last of the plug was then drilled out and the bit was run several joints below the casing into the open hole, bringing back cement mud and also some gassy mud from the old hole. Adding baryte was begun at 6:30 p.m. and the gain in density showed in the returns at 8 p.m. and increased continually until a streak came back at 10:20 p.m., showing the mixing in of light mud that was gunned up in the adjoining pit some time after starting the addition of baryte. The density finally showed higher than the desired 13 lb. per gal., whereupon some mud was pumped out to the reserve pit where it sank to the bottom and some of the light mud from the reserve pit was allowed to flow off the top into the circulation pits. This procedure was repeated several times.

Then on the chart presented is shown the gradual equalization of heavier mud with lighter mud until orders were received to cut the density back to 12.0 lb. per gal. to permit the nitroglycerin shot to sink in the hole. Only the mud in the small suction pit and in the well was then diluted with water; which was started at 2:45 p.m. After all the mud in the system was equalized at 12.0 lb. per gal., the crew started out of the hole with the drill pipe at 9:20 p.m. At 1:45 a.m., the drill pipe had been pulled from the hole. Notations on the chart show the other operations performed, until the chart was changed again at noon.

It is evident from the chart record as shown above that efficient supervision and control of this well was made possible through the use of this automatic mud-weighing and recording machine.

●

New Type Renovation Job Looks Promising

IN the Nocona field of North Texas, a renovation job has been completed on a well with promising results. In order to eliminate caving of the oil sand and reduce sand production, the 12-ft. thickness of soft sand was gravel packed. Since the well had been producing only 2 bbl. of oil per day, it was necessary to use a gravel-packing method that could be carried out very economically. This requirement was accomplished through the use of cable tools.

First step was to enlarge the hole through the productive sand. Small shots of nitroglycerin were used to dislodge the material from the walls, and each shot was followed by thorough cleaning with cable-tool bailers and sand pumps. As the gravel was placed in the enlarged hole measurements were made to determine the detph filled by each batch. It was found that part of the hole had a 4½-ft. diameter, and that the minimum diameter was about 1 ft.

The slotted liner was not placed until the hole had been filled with ¼-in. to ⅜-in. gravel. Since the formation was soft, it had been decided that the liner could be driven down through the gravel bed. The end of the liner was closed by a tapered bull nose and was fitted at the top with a drive collar. A flat-end bit with stem and jars was used on the wire line to drive down the liner. Eight hours were required for the driving operation.

The first tests after the job had been completed were very encouraging, but since production has not yet settled down there is no way of determining what the daily output will be when the initial increase has leveled off. One test showed the well capable of producing 16 bbl. per day.

The cable-tool method of gravel packing old

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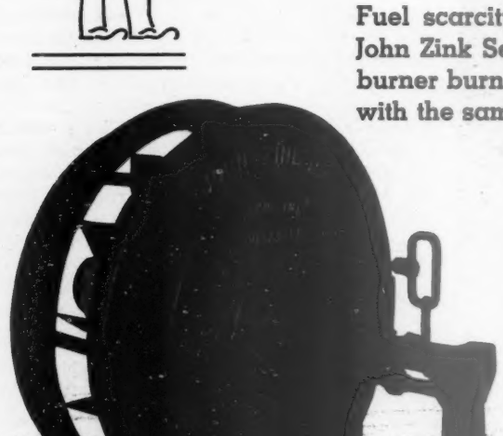

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low-pressure producers has been employed in the Loma Novia field of South Texas and in the Texas Panhandle. In one case it is reported that a company succeeded in driving 100 ft. of flush-joint liner into a preplaced gravel bed. Use of this method can be expected to increase, because of the small amount of equipment required, and its low cost.

●

Flow of Gas-Oil-Water Mixtures

(Continued from Page 25)

effective permeability to oil in some saturation regions is less, and in others greater, than it is for the same oil saturations in two-phase flow, see Fig. 17(*b*).

The change in effective permeability to gas and oil for 15-25 per cent interstitial water saturation relative to no water saturation is indicated in Fig. 18(*a*). The approximate limits of saturation which is capable of producing 5 per cent more by volume of gas, oil, and water is illustrated by Fig. 18(*b*).

Effect of Interstitial Water

The effect of 20 per cent, and 40 per cent, interstitial water saturation on the ratio of effective permeabilities is shown in Fig. 19. As the presence of interstitial water has only a slight effect on the ratio of effective permeabilities, Leverett and Lewis[1] have concluded that the presence of interstitial water does not increase appreciably the ultimate recovery available to solution-gas drive.

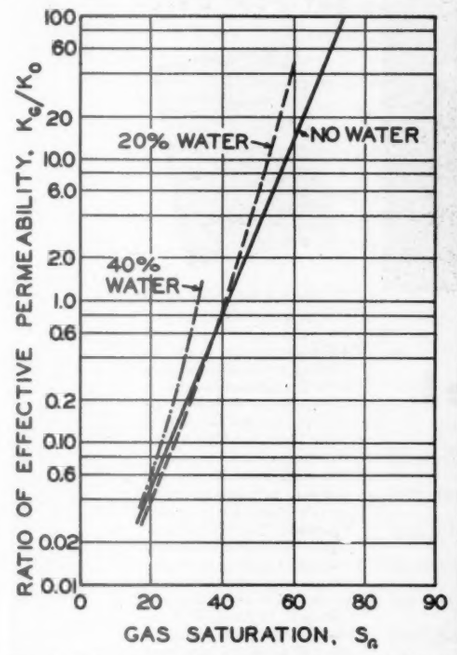

Fig. 19. K_g/K_o vs. S_w (after Leverett and Lewis, A.I.M.E.)

4. *Nonuniform permeability.*—Under Topics 4, 6, and 7 the upper limit of ultimate recovery by gas drive and water drive under the idealized condition of uniform permeability and absence of capillary and gravitational forces were indicated. However, the permeability of reservoirs is not uniform. The permeability ratio of the individual pay intervals is never less than five and in some instances as high as 20. In other words, there is a five-to-twenty-fold variation in the vertical distribution of horizontal specific permeability. The effect of nonuniform permeability in the absence of capillary and gravitational forces is such that the ultimate recovery with a gas drive or a water drive whether natural or artificial is less than the corresponding ultimate recovery available from media of uniform permeability.

References

1. Leverett, M. C., and Lewis, W. B., "Steady Flow of Gas-Oil-Water Mixtures Through Unconsolidated Sands," A.I.M.E., Petr. Tech., May 1940.

●

Magnesium May Be Obtained From Oil-Field Brine

PRELIMINARY investigations made in the Oklahoma Geological Survey laboratory at Norman, Okla., indicate the possibility of extracting magnesium from oil-field brines, as a byproduct of disposing of the waste fluid that must be pumped from many wells in order to produce oil.

The process suggested by A. L. Burwell, chemical engineer on the survey staff, is similar to that now in use at Freeport, Tex., on seawater and calls for the controlled treatment of the brine with milk of lime or milk of dolomite to form magnesium hydroxide, or "milk of magnesia" which is insoluble in brine. Milk of dolomite is preferable to milk of lime, because magnesium comes both from the brine and dolomite and thus the magnesium hydroxide recovery will be greater.

It is estimated that approximately 100,000 bbl. of brine are being forced back into the subsurface formation daily, by disposal systems under the jurisdiction of the pollution department of the Division of Water Resources, Oklahoma Planning and Resources Board. This is equivalent to about 46,000,000 lb. of brine. With a magnesium content of 2,000 p.p.m., 270,000 lb. of magnesium hydroxide could be made daily. This means that the equivalent of 92,000 lb. of magnesium metal is going back underground daily, or 33,500,000 lb. per year.

Magnesium hydroxide may be converted into metal and other products which have commercial value.

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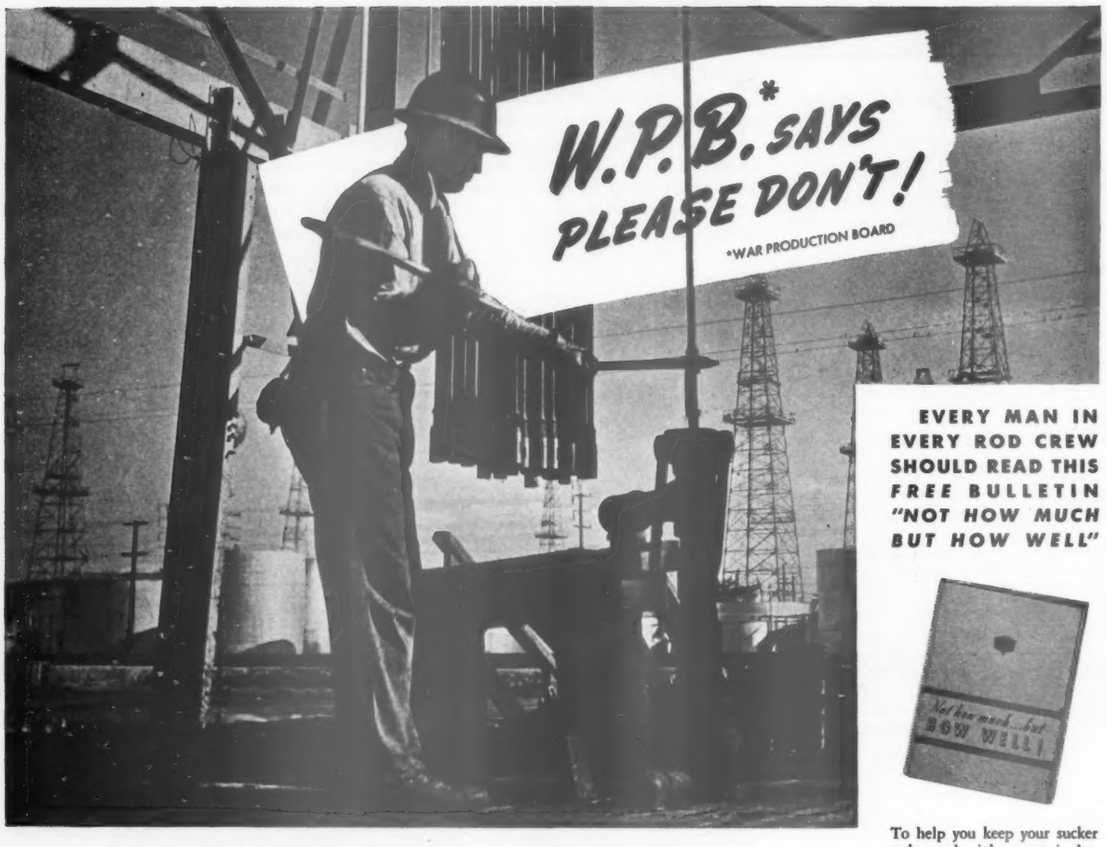

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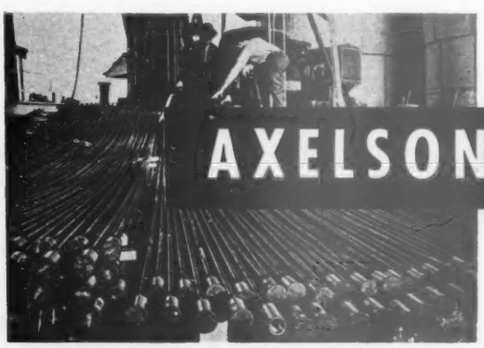
Get the most out of the Sucker Rods you now have!

Tires, automobiles and gasoline aren't the only things rationed today. Rod stock is likewise on "the hard-to-get list," in fact in some cases, impossible to obtain. Such a condition is regrettable, but unavoidable. Even our oldest customers will experience delay on delivery. That is why we earnestly request your cooperation in the handling and servicing of Axelson rod strings you now have in operation. Proper care of sucker rods will prolong their service life. It is vital not only to the oil industry that material be conserved, but it is just as essential to every other industry which uses steel. Make your sucker rods last for the duration. It will pay you dividends.



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CO$T Engineering

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

RIG OPERATION

JULY 9, 1942

USE OF CORRECT TOOL RESULTS IN REDUCED COSTS

IN the effort to save money on a particular job or to reduce operating expense generally, some engineers and production superintendents often take unnecessary chances. This is often due to pressure from other points in the organization on the production department to reduce its operating budget.

The fact that many companies are still able to operate in the face of increased taxes and other charges, while still operating under a comparatively low price for the produced oil, is evidence that the production department takes its responsibility seriously and is already doing what it can to keep expenditures to a minimum. Injudicious savings often result in an increase in expenses.

First Costs Not Final

There is a fairly recent case in which one company purchased a large number of small engines with which to operate pumping units. The original cost was much less than other available engines and the purchase was apparently justified on that basis. In operation, however, the inexpensive engines failed frequently enough that their cost of upkeep was almost sufficient to pay for a new engine. In addition, the loss of production was a serious matter. New, larger and more expensive engines were purchased for the work, performed satisfactorily, and paid for themselves in a very short period of time.

This fact of reduced first cost adding to expense is even more apparent in the drilling department or in the maintenance and workover department. Even the best of wells must be repaired occasionally and for this purpose an estimate is made on the work and either a rotary rig or a cable-tool machine moved in. There is a temptation to underestimate the cost of the repair job and the contingencies are often ignored. The preliminary figure is more often a hope than an engineering estimate.

As the expense of the job mounts, the temptation is to "save" money by using inferior tools or doing without them. This in turn leads to a worse job which may entail an additional investment in the well. The expense might have been avoided if, in the original plan for the work, sufficient funds were allotted for equipment which was needed and in which the men performing the job had faith.

One of the common-type jobs, for which a cable-tool machine is rigged up, is the repair of a casing leak by squeezing cement through the hole and into the annulus. The main part of the job is to pull the tubing, rerun it to the proper depth and cement, the cementing truck providing the necessary pump. If the job is performed satisfactorily only a few days' time for the cable-tool machine plus the cost of cement, cement truck and cement retainer are charged to expense.

The latter item costs around $155 for the size used in 5½-in. casing and this is an important item in the cost of the job. There is a temptation to eliminate this cost and thus reduce the total charge for the job. Following such a course, however, generally results in an increase instead of a reduction in costs.

Braden-Head Squeeze

The braden-head squeeze job is a common procedure in the oil field. In this method the tubing is run in the hole open-ended and the tubing and annulus filled with fluid. Cement is then pumped into the tubing and displaced, the braden-head being closed when the cement reaches the point opposite the leak. This forces the cement through the leak and behind the pipe. When a cement retainer is used, the cement is forced out below the packer and through the hole in the casing.

The job can be done without a retainer. However, the chances of completing it successfully are about one to two. There are a number of things which can go wrong, the principal ones being the lack of a satisfactory shut-off, the bursting of the casing at another point than the one being repaired and the cementing of the tubing in the hole. This latter is quite common due to the fact that a slight error in the displacement measurements will cause cement to be present in the annulus between the tubing and casing. The pressure must be held on the casing and tubing until the cement has taken its original set and consequently, the tubing becomes cemented in the well. Seriousness of this condition varies with the job but there have been cases where the tubing was cemented in for a considerable length.

Cutting-Out Costs High

After the tubing is cemented in, there is only one way of removing it and that is through a cutting-out job. For this type of job a light rotary rig has to be moved in and rigged up. This will cost $175 per day. If there is not too much cement holding the tubing, the job can be perfomed in 2 days; on the other hand, it may require as much as 10 days to recover the tubing. In addition to the rig expense, there is the down time on the well during which there is no income from it.

With the chances for cementing in the tubing being what they are, the best that can be hoped for is a net loss of $5 for each repair job performed with a braden-head squeeze. Actually, on four jobs recently attempted in this manner, the additional cost amounted to $580, or $145 per well. This came about when a considerable portion of the tubing was cemented in the hole on one well and the cutting-out job was long and tedious.

Another factor which has not been considered is the saving in time through the use of the retainer. The braden-head job requires some connection work which runs up a little more time and hence adds to the cost of the well repair.

Research....

KEYSTONE OF

PITTSBURGH-DES MOINES' PROGRESS

The program of engineering research maintained by the Pittsburgh-Des Moines Steel Company over the years, now culminates in the establishment of a Multiple Fellowship on Chemical Containers and Storage at the Mellon Institute of Industrial Research.

Utilizing the unlimited scientific resources of the Institute, the Fellowship will conduct research on the problems connected with bulk storage of chemical substances, including water, oils, and gases.

At the present time, the Fellowship is working on vital problems connected with the storage of chemicals in the synthetic rubber industry, including butadiene, styrene, acrylonitrile, and isobutylene.

The general research conducted by the Pittsburgh-Des Moines Chemical Storage Fellowship will develop much new chemical and physical data available to our clients, in the form of reports and recommendations as to the most suitable types of containers, construction, temperatures, pressures, linings and coatings for the protection of the container and the substances for which bulk storage facilities are desired.

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CO$T Engineering

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL — EVALUATION

JULY 9, 1942

DETERMINING INCOME FROM LEASE HAVING AN OVERRIDE

ONE of the common types of transactions in the oil industry is for the owner of a lease to sell it to a second party, receiving as his consideration an interest in the income from the property. In most cases this works out to the mutual advantage of the original owner and the buyer. The owner may not wish to establish a producing organization in that particular field whereas the purchaser may already have such an organization operating there.

The amount of interest retained by the original owner of the lease is arrived at by agreement. Generally sufficient overriding interest is sought to make as much, or more profit, as would be obtained by operating the lease. On the other hand, there is a limit to the size of an overriding interest which a property can carry. In some cases a profit could be made from an operation carrying a 50 percent override while in others the income is not great enough to pay anything for the privilege of operating the lease.

In previous installments the several ways of computing the income from a property were given. These same methods are herein applied to the same property having a one-fourth overriding interest. In this case, a consideration of $1 is paid for the lease, the original owner getting an additional ¼ of ⅞ of the oil produced. The question is whether the property can be bought under such conditions and whether it will pay more money than if $96,000 is the sale price. (The property is a 160-acre lease, undeveloped, with an estimated recovery of 4,000 bbl. to the acre. Four wells at $50,000 each will need to be drilled.)

Where a property is purchased under such an arrangement there is no deduction for depletion if carried on a cost basis. Instead the override interest is deducted in obtaining the net income from the property. Table 1 shows the results of a calculation for estimating the income without deducting interest charges.

It is evident that after deducting the necessary expenses the profit will be $107,674 over the 15-year life of the property. Under the agreement where $96,000 was paid for the property the profit was $150,573. In other words, the purchaser makes $42,899 less by paying nothing for the property and accepting the one-fourth override.

When an estimate is made which includes the interest charges (Table 2) it is seen that the property begins paying a profit during the fifth year. The net profit is shown to be only $19,529 which has a present worth of $10,387.

The property cannot justify such an investment and even though it requires no original outlay to purchase the lease, it is an unsound investment.

TABLE 2—INCOME FROM PROPERTY WITH INTEREST DEDUCTED

Year—	Inv.	Int.	Net	P or L	Deprc.	Bal.	Prof.	Present worth
1941	100,000	4,500	3,675	*825*	6,563	94,262	*825*	....
1942	194,262	10,156	7,576	*2,580*	15,312	181,520	*3,405*	....
1943	181,530	10,892	9,800	1,092	17,500	165,122	*4,497*	....
1944	165,122	9,907	11,800	1,893	17,500	143,125	*2,594*	....
1945	143,125	8,588	11,800	3,212	17,500	125,625	618	475
1946	125,625	7,537	11,800	4,263	17,500	108,125	4,263	3,090
1947	108,125	6,488	11,800	5,312	17,500	90,625	5,312	3,633
1948	90,625	5,437	11,800	6,363	17,500	73,125	6,363	4,104
1949	73,125	4,388	8,524	4,136	17,188	55,937	4,136	2,518
1950	55,937	3,356	7,395	4,039	15,937	40,000	4,039	2,318
1951	40,000	2,400	5,436	3,036	13,594	26,406	3,036	1,642
1942	26,406	1,584	3,780	2,196	11,250	15,156	2,196	1,119
1953	15,156	909	2,176	1,267	9,062	6,094	909	437
1954	6,094	365	400	35	5,000	1,904	365	165
1955	1,094	66	*88*	*154*	1,094	0	*154*	....

TABLE 1—ESTIMATING NET INCOME FROM PROPERTY HAVING ¼ OVERRIDE

Year—	1941	1942	1943	1944	1945
Production, well No. 1, bbl.	14,000	14,000	14,000	14,000	14,000
Production, well No. 2, bbl.	7,000	14,000	14,000	14,000	14,000
Production, well No. 3, bbl.	.....	14,000	14,000	14,000	14,000
Production, well No. 4, bbl.	.....	7,000	14,000	14,000	14,000
Total	21,000	49,000	56,000	56,000	56,000
Working interest at $1.05	$22,050	$51,450	$58,800	$58,800	$58,800
Less, lifting costs*	4,200	9,800	11,200	11,200	11,200
Less ¼ override	5,512	12,862	14,700	14,700	14,700
Less, deprec. at $0.3125 per bbl.	6,563	15,312	17,500	17,500	17,500
Less, tax, overhead, $0.10 per bbl.	2,100	4,900	5,600	5,600	5,600
Total	$18,375	$43,874	$49,000	$49,000	$49,000
Net	3,675	7,576	9,800	9,800	9,800

Year—	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955
Prod., well, No. 1, bbl.	14,000	14,000	14,000	13,000	11,500	9,500	8,000	6,000	.....	.....
Prod., well, No. 2, bbl.	14,000	14,000	14,000	14,000	12,500	10,000	8,500	6,500	3,500	.....
Prod., well, No. 3, bbl.	14,000	14,000	14,000	14,000	13,000	11,500	9,500	8,000	6,000	.....
Prod., well, No. 4, bbl.	14,000	14,000	14,000	14,000	14,000	12,500	10,000	8,500	6,500	3,500
Total	56,000	56,000	56,000	55,000	51,000	43,500	36,000	29,000	16,000	3,500
Working int. at $1.05	$58,800	$58,800	$58,800	$57,750	$53,550	$45,675	$37,800	$30,450	$16,800	$3,675
Less, lifting costs*	11,200	11,200	11,200	12,100	11,730	10,875	9,720	8,700	5,600	1,400
Less ¼ override	14,700	14,700	14,700	14,438	13,388	11,420	9,450	7,612	4,200	909
Less, deprec., at $0.3125 /bbl.	17,500	17,500	17,500	17,188	15,937	13,594	11,250	9,062	5,000	1,094
Less, tax, overhead $0.10 /bbl.	5,600	5,600	5,600	5,500	5,100	4,350	3,600	2,900	1,600	350
Total	$49,000	$49,000	$49,000	$49,226	$46,155	40,239	34,020	28,274	16,400	3,763
Net	14,700	14,700	14,700	8,524	7,395	5,436	3,780	2,176	400	88

*See above.

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Engineering Fundamentals

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL No. 24

JULY 9, 1942

MUD-MIXING CALCULATIONS

ORDINARILY, the weight of a drilling mud is controlled by varying the proportion of solid and liquid in the mud mixture. If it is desired to increase the density, solid material is added. If it is desired to decrease the density, dilution with water will usually accomplish the desired result.

The principal reason for increasing the density of a drilling mud is to protect against the possibility of a blowout due to high-pressure formations encountered. It is possible also that under certain conditions increased density aids materially in preventing caving, since the higher the density of a mud the greater outward pressure it will exert against the wall of the open hole at a given depth; thus, the denser mud furnishes a more substantial support for the wall. It is sometimes desirable to decrease density in order to reduce penetration of mud into permeable zones.

Rather than use cut-and-try methods of adding some clay or heavy mineral to increase mud density and weighing the resultant mixture to determine if the mud density has been brought to the desired value, it is much better to be able to calculate beforehand just how many pounds, 100-lb. sacks, or tons of a certain clay or weighting material will be required to accomplish the desired final result. The method of calculating the amount of weighting material required for a given situation will now be discussed and demonstrated.

The calculations are based on two simple facts, namely:

1. Volume of original mud + volume of material added = volume of final mixture.

2. Weight of original mud + weight of material added = weight of final mixture.

Example 1

Problem.—The circulating pit at a certain rotary well is 75 ft. by 20 ft. by 6 ft. in size. A commercial clay having a specific gravity of 2.4 (water = 1.0) is to be mixed with water to use in drilling the surface hole. How many tons of the clay must be mixed with water to fill the pits with a mud having a density of 9.0 lb. per gal.?

Solution.—The volume of the circulating pit is 75 × 20 × 6, or 9,000 cu. ft.

Let V_c = grain volume of clay added. (This would be the displaced volume of the dry clay when placed in water.)

Now,

Volume of original mud (water in this case), cu. ft. = 9,000 — V_c

Volume of material added, cu. ft. = V_c.

Volume of final mixture, cu. ft. = 9,000.

Now, write a weight balance equation based on statement (2) above.

1. Weight of original mud (water in this case) = density in lb. per cu. ft. times volume in cu. ft. = 62.4 (9,000 — V_c.

2. Weight of material added = density in lb. per cu. ft. times volume in cu. ft. = 62.4 × 2.4 × V_c.

3. Weight of final mixture = density in lb. per cu. ft. times volume in cu. ft. = 9.0 × 7.48 × 9,000.

$$\text{So, } 62.4\ (9{,}000 - V_c) + 62.4 \times 2.4 \times V_c = 9.0 \times 7.48 \times 9{,}000$$

or,

$$561{,}600 - 62.4\ V_c + 149.76\ V_c = 605{,}880$$

$$87.36\ V_c = 44{,}280$$

$$V_c = 507 \text{ cu. ft.}$$

Since 1 cu. ft. (grain volume, not bulk volume) of the clay weighs 2.4 × 62.4, or 149.76 lb., the weight of clay required would be

$$W = \frac{149.76 \times 507}{2{,}000} = 38.0 \text{ tons.}$$

Example 2

Problem.—Using the dimensions of the hole and circulating pits at a rotary well, the volume of the circulating system is found to be 10,500 cu. ft. The density of the mud in the system is now 9.5 lb. per gal. The well is drilling at a depth of 5,000 ft. and it is desired that the mud be made of high enough density to exert 2,700 lb. per sq. in. at the bottom of the hole. How many 100-lb. sacks of a weighting material having a specific gravity of 4.2 will be required? If the circulating system is full of 9.5-lb. mud, how many cubic feet of this mud should be jetted into the reserve pit to prevent overflowing the circulating pit when the weighting material is added?

Solution.—Use method similar to Example 1,

Volume of original mud, cu. ft. = 10,500 — V_c.

Volume of material added, cu. ft. = V_c.

Volume of final mixture, cu. ft. = 10,500.

To calculate the density of mud required to exert the desired bottom-hole pressure, use the method demonstrated in Example 2, Installment 5, as follows:

$$\text{Density, lb. per cu. ft.} = \frac{2{,}700 \times 144}{5{,}000} = 77.8$$

Then, writing a weight balance equation as in Example 1.

Weight of original mud + weight of material added = weight of mixture.

$$9.5 \times 7.48 \times (10{,}500 - V_c) + 62.4 \times 4.2 \times V_c = 77.8 \times 10{,}500$$

Solving, V_c = 370.5 cu. ft.

Since V_c represents the volume displaced by the weighting material, it is also the volume of mud that must be jetted into the reserve pit to prevent overflow of the circulating pit.

The number of 100-lb. sacks of weighting material required would be

$$\frac{62.4 \times 4.2 \times 370.5}{100} = 971$$

Example 3

Problem.—How many barrels of water must be added to 500 bbl. of mud to reduce the density from 10.0 to 9.5 lb. per gallon?

How many barrels of the lighter mud would result?

Solution.—Let V_w = volume of water added, bbl.

Write a weight balance equation, similar to previous examples,

$$10 \times 42 \times 500 + 8.34 \times 42 \times V_w = 9.5 \times 42 \times (500 + V_w).*$$

Solving, V_w = 215.5 bbl. of water.

Volume of 9.5-lb. mud resulting = 500 + 215.5 = 715.5 bbl.

*The number 42, representing the number of gallons in 1 bbl., is not necessary in the equation, since it is common to all terms and will divide out. It is left in, however, for the purpose of clearness, so that the weight balance will be in terms of pounds.

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma

Engineering Fundamentals

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL No. 25

JULY 9, 1942

ENERGY AND WORK

As a fundamental basis for many practical considerations that may arise in oil-field work, it is often valuable that a person have a clear understanding of the meaning and significance of the terms *energy* and *work*. A discussion of these terms with certain illustrative examples and calculations will be given.

Energy may be defined as the ability to do work. Any body of material in motion may have ability to do work because of its motion. The energy due to such motion is termed *kinetic energy*. Any flowing stream of gas, oil, or water in a pipe line possesses kinetic energy. A positive displacement fluid meter, placed on a line to measure quantity of flow, depends upon the kinetic energy of the moving stream of fluid in the pipe for its operation.

The energy of a body due to its position, or any state other than motion, is said to be *potential energy*. For example, consider a tank containing air or gas under high pressure. Although the air or gas may not possess any kinetic energy, because it is not in motion, it may possess considerable potential energy because of its pressure. An excellent field example is the compressed-air tank that is often used for starting large internal-combustion engines. The compressed air in the tank represents a store of energy that can be utilized to do the useful work of starting the engine.

The doing of work is merely the transferring of energy. In the example of the use of compressed air to start the engine, the air gives up the potential energy which it possesses due to its pressure and transfers it in the form of kinetic energy to the engine. Thus, the air does work while the engine has work done upon it.

The amount of work done in any particular case may be expressed in terms of the product of the force acting and the distance through which it acts. In the engineering terminology of this country, work is commonly expressed in terms of foot-pounds. One foot-pound of work then would be the equivalent of moving 1 lb. a vertical distance of 1 ft., or of applying a force of 1 lb. to move a body a distance of 1 ft. in the direction that the force was applied.

Some simple calculations will now be given to illustrate the preceding discussion.

Example 1

Problem.—How much work is done upon a string of cable tools weighing 2,200 lb. in lifting them from the bottom of a 2,000-ft. well?

Solution.—The work actually done upon the tools is 2,200 × 2,000, or 4,400,000 ft.-lb.

Of course, more work than this must be done at the surface, because the line attached to the tools weighs something and work must be done in withdrawing the line from the well. Also, due to a certain amount of friction of the tools against the walls of the hole, the upward force actually exerted on the tools would exceed their weight somewhat.

Example 2

Problem.—What potential energy does the string of tools of Example 1 possess with reference to the bottom of the hole when at the surface?

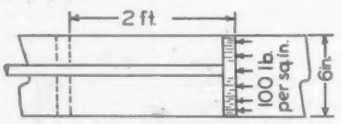
Solution.—The potential energy, or energy due to position, of the string of tools is 4,400,000 ft.-lb., the same as the work done upon them in lifting them from the bottom of the well. That is, the tools at the surface possess enough potential energy, if it could all be utilized, to do 4,400,000 ft.-lb. of work in falling to the bottom of the well.

Example 3

Problem.—In lifting a string of pipe the traveling block carries a load, according to the weight indicator, of 60,000 lb. How much work is done by the traveling block in lifting the pipe the length of a 30-ft. joint?

Solution.—The work done is 60,000 × 30, or 1,800,000 ft.-lb.

Example 4



Problem.—A constant pressure of 100 lb. per sq. in. acts against a piston face 6 in. in diameter. How much work is done upon the piston in moving it a distance of 2 ft. in a direction perpendicular to the piston face?

Solution.—The area of the face of the 6-in. piston is,

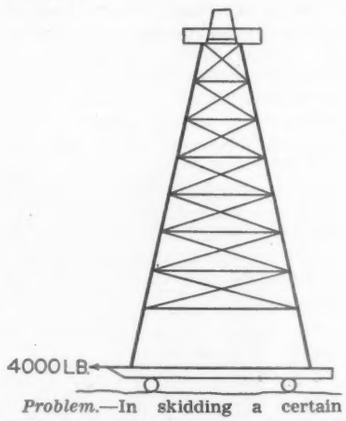
$$A = \frac{\pi d^2}{4} = \frac{\pi(6)^2}{4} = 28.27 \text{ sq. in.}$$

The total force acting against the piston is 100 × 28.27, or 2,827 lb.

The work done is 2,827 × 2, or 5,654 ft.-lb.

As the problem is stated, this would represent the amount of work done upon the piston by the material under pressure, as for example steam acting at constant pressure against the piston of a steam engine (although the dimensions are not representative of those commonly used for steam engine cylinders). It is of interest, however, to note that the process could be reversed as if the machine were a pump or compressor with the piston acting against a constant pressure of 100 lb. per sq. in. for a distance of 2 ft. Under such conditions the work done would be the same, but the piston would do the work rather than be worked upon.

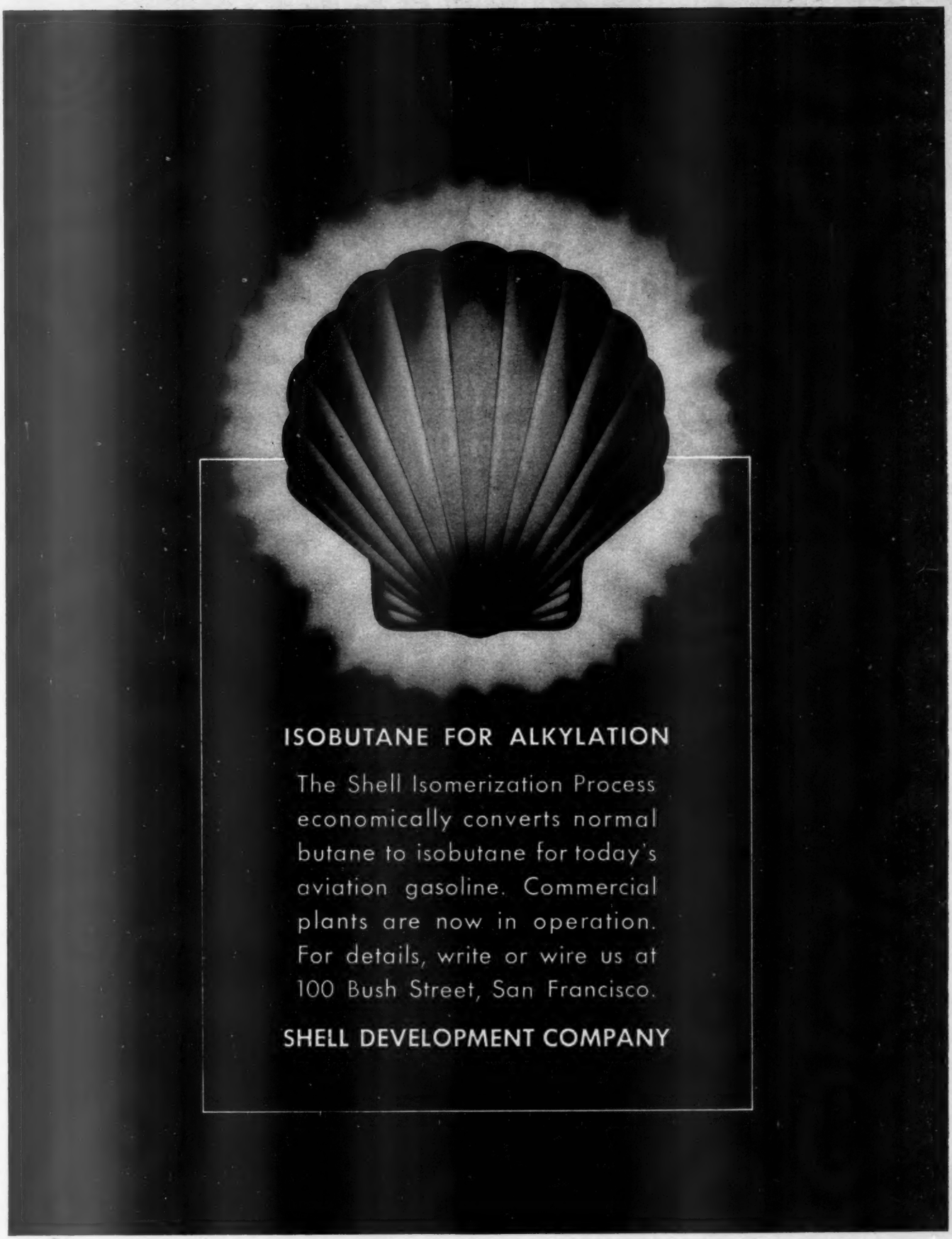
Example 5



Problem.—In skidding a certain drilling derrick, an average force of 4,000 lb. must be exerted to move the derrick. How much work is done in moving the derrick a distance of 660 ft.?

Solution.—The work required would be 4,000 × 660, or 2,640,000 ft.-lb. This is true regardless of the actual weight of the derrick. Thus a light-weight derrick with no rollers under the skids, with a soggy ground surface, or with some other conditions to result in more frictional resistance to skidding may require just as much work in moving it a given distance as a much heavier derrick with more ideally perfect conditions.

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma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REFINERY ACTIVITY AND EXPANSION

War Gives Oil and Automotive Technicians Chance to Cover Many Years in One Stride

ATLANTIC CITY, N. J.—The way will be open after the war for abrupt and substantial advances in motor transporttaion, according to Dr. Graham Edgar, vice president of the Ethyl Corp. Speaking before the annual meeting of the American Society of Testing Materials at Atlantic City as the seventeenth Marburg lecturer, Dr. Edgar declared that because of conditions brought about by the war oil and automotive industries will have unique opportunities to cover in a single stride the technological advances in transportation which would formerly have required years of gradual improvements.

It seems fairly obvious, Dr. Edgar said, that aviation gasoline will be much more important after the war than before, and that 100-octane number aviation gasoline, or better, will be the quality generally employed.

"But what of the future of motor gasoline?" Dr. Edgar asks. "The tremendous demand for high-octane aviation gasoline together with the program for synthetic rubber has brought about the erection of greatly increased catalytic cracking capacity, and this capacity undoubtedly can and will be used after the war to produce motor gasoline of high antiknock quality. Plants for producing the alkylate so necessary for aviation gasoline will have capacities probably much greater than the post war demand for aviation gasoline, as great as they may be expected to be. Plants for producing toluene and other aromatics will probably be available. Furthermore, the research and development laboratories of the petroleum industry, always alert, have been profoundly stimulated by the war effort, and can be counted on for processes which are improvements over what we have today. I believe it to be conservative to say that the petroleum industry will be in a position to produce motor gasoline of much higher effective antiknock value than that which was produced in 1941."

Of the various characteristics of gasoline perhaps the most important, as far as the ultimate development of the internal-combustion engine is concerned, is the tendency to knock, Dr. Edgar said. Limits imposed by this tendency have gradually lifted over a period of many years as the petroleum industry has produced gasolines of higher and higher antiknock value. This has come about through the use of knock inhibitors such as tetraethyl lead and an increasing knowledge of gasoline chemistry.

Further declines in the octane number of regular gasoline may develop, he said.

Sketches of Plant Operators . . .

MICHAEL HALPERN, vice president in charge of refining for the Texas Co., New York, has recently completed his twenty-sixth year as a member of this extensive integrated corporation which includes more than a score of domestic refineries.

Mr. Halpern rose to his present position as chief executive officer of the manufacturing department the hard way. He started his career with the company on June 19, 1916, as assistant civil engineer at the company's Bayonne, N. J., terminal. He was born in New York City, September 15, 1892, and prepared for his engineering pursuits at Townsend Harris High School and New York University.

His first promotion with the Texas Co. was to the post of civil engineer at the Bayonne terminal, July 1, 1917, and on January 28, 1921, he became assistant superintendent at Providence, R. I. He next became superintendent of the company's Delaware River terminal on January 8, 1923.

Experience with the company's Gulf Coast operations started in June 1925, when Mr. Halpern was appointed acting superintendent at Fort Neches and on January 1, 1926, he became first assistant superintendent of that plant. He was transferred to Houston, Tex., May 1, 1926, and became auditor of operations for the refining department. Two years later, he became second assistant superintendent of the company's largest refinery at Port Arthur, Tex., and on September 1, 1930, he was transferred to the executive department at New York as assistant to the general manager of the refining department.

Mr. Halpern was appointed manager of manufacturing on February 15, 1937, and he was promoted to the office of general manager, refining department, on September 1, 1938. He was elected vice president of the company in October 1940.

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WHO'S WHO IN REFINING

Phillips Petroleum Company

PHILLIPS PETROLEUM CO.'S position as probably the largest producer of natural gasoline and liquefied petroleum gases gives the company an unusual versatility in its refinery operations.

Among accomplishments the Phillips company could look upon with justifiable pride on its twenty-fifth birthday last month are its progress as a producer of aviation gasoline and of synthetic-rubber components, two of the most vital petroleum products required by the war.

The company operates four refineries. Two are in Texas, at Borger in the Panhandle and at Penwell in the Permian basin. Another is at Kansas City, Kans., and the fourth is at Okmulgee, Okla.

A few weeks ago Frank Phillips, chairman of the board, and K. S. Adams, president, announced that the company had contracted with the Government to design, build and operate two new plants which will manufacture butadiene and styrene. These products are the two chief ingredients of the important styrene type of synthetic rubber.

The extensive but necessary design and planning work had been under way for some time previous to execution of the contract. The basic designs on the butadiene plant are practically completed, detailed engineering well under way, plant site selected and a large part of the materials have been ordered under the highest priority ratings. Design and engineering of the styrene plant are also well advanced and the plant site selected.

As joint owner of Hycar Chemical Co., Phillips has been producing butadiene-type synthetic-rubber ingredients for some time and it was a move for which the company was well qualified and prepared to increase its operations to wartime requirements.

Phillips has been an important contributor to technical advancement of the industry. A research division first organized in 1923 was elevated to full department status in 1925 and from its operation has come some of the complex modern products which enhance the petroleum industry's value to the United Nations' war planning.

The Phillips company built the first commercial polymerization plant at Borger. Previous and resultant studies of converting the lighter hydrocarbons into useful motor fuel contributed to the art and technique of alkylation. Neohexane is one of the high antiknock hydrocarbons resulting from Phillips' study of and work with the lighter fractions.

SUMMARY OF REFINERY OPERATIONS

Location—	Capacity, bbl. daily— Crude	Cracking
Borger, Tex.	35,000	17,000
Penwell, Tex.	1,000	750
Okmulgee, Okla.	6,000	1,500
Kansas City, Kans.	23,000	12,000
Total	65,000	31,250

Another Phillips' contribution to the industry is the copper sweetening process for treating gasoline which eventually led to the catalytic desulfurization method of improving the lead susceptibility of motor fuel.

The Phillips refineries distribute their products throughout the Middle West, Mid-Continent and Southwest. Most of the motor fuel for Middle West consumers is shipped through a products' pipe line system extending from Borger, Tex., to Chicago via East St. Louis, Ill. This transportation system, operated as a refinery auxiliary, is 8-in. throughout and is capable of handling 45,000 bbl. daily. The 736-mile Borger-to-St. Louis leg of the line, built in 1930, was the first long-distance products pipe line operated by the industry.

Refinery operations are under the direction of M. P. Youker, vice president in charge of manufacturing, and W. G. Hiatt, manager of the refining department. G. G. Oberfell, vice president, is director of research and the close affiliation of these two divisions is evident from the development and commercial application of a whole series of "firsts." The Borger plant is under supervision of Hugh Miller and J. W. Mitchell is superintendent at Kansas City. R. D. Evans is refinery superintendent at Okmulgee and E. H. Daniel has the same position at Penwell, Tex.

●

Polymerization Plant at Wilcox Refinery Operating

A new nonselective polymerization plant has been completed and placed in operation at the H. F. Wilcox Oil & Gas Co. refinery at Bristow, Okla. A feature of the new unit is that the total gas produced by the cracking plant is used as raw charge along with that from the stabilizer.

This type of operation was selected for its adaptation to the production of aviation base-stock codimer.

Initial operating data on the polymerization unit indicate a yield of more than 3 per cent of the total cracking-plant charge, resulting in an increase of 6 per cent in total cracked gasoline.

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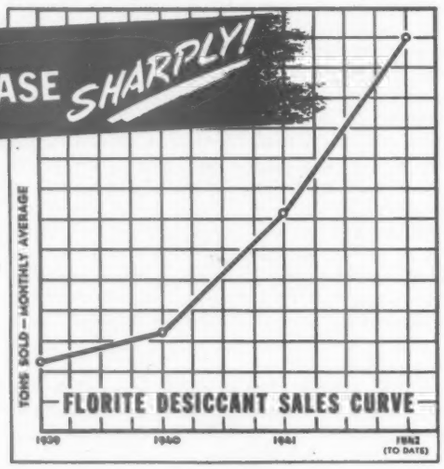

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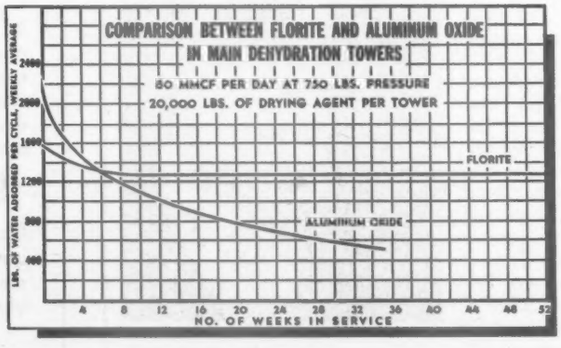
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Pipe-Line Activity

War Emergency Organization Prepares for Big Line

Specifications will be issued this week to contractors for the construction of the 24-in. line for War Emergency Pipe Line, Inc., from East Texas to Illinois. These will be issued from the company's offices which are being established in the Rector Building, Little Rock, Ark. Bids will be received in Washington, D. C., in the middle of next week. Construction of the entire project will be directed from the main office of the organization at Little Rock.

A. N. Horne has been appointed general superintendent and he will have charge of operations. In this undertaking he is associated with Burt E. Hull, president of Texas Pipe Line Co., who manages the project as vice president of War Emergency Pipe Line, Inc. W. Alton Jones, president of Cities Service Co., is president of the company.

In order to enter his new duties, Mr. Horne has been released from active duty with the U. S. Army in which he has served as major in the War College at Washington, D. C., since late last year. Before going into active service from the reserve, Mr. Horne was manager of Empire Pipeline Co.

Pipe is scheduled to start arriving at points along the right-of-way at the end of this week. The management is pushing preparations for the laying of the line even though certain preliminary arrangements had not been completed early this week. It is reported that as yet purchase of right-of-way has not begun because authorizations necessary for expenditure have not been approved.

Aerial Survey Contract Let For War Emergency Project

Contract has been let for an aerial survey of sections of the route of the system to be built for the War Emergency Pipe Line Co., Inc. For this undertaking, use will be made of part of the aerial survey completed last summer for the project designated then as National Defense Pipe Lines, Inc. This previous survey provided for the route from East Texas to Little Rock, Ark. One section of the new aerial survey will be between Little Rock and a point 2 miles north of the bridge crossing the Mississippi River at Thebes, Ill.; other sections to be aerial surveyed are: Norris City, Ill., to Mount Vernon, Ind.; Norris City, Ill., to a pump-station site.

Contract has been awarded to Aero Exploration Co. which made the original aerial survey last year. This aerial survey organization is also making surveys of areas in northwestern and northeastern states for the federal Government.

Work Proceeds for Phillips Pipe Line to Borger, Tex.

Practically all the pipe has been shipped which is required for the construction of the pipe-line system being built for Phillips Petroleum Co. to move natural-gasoline-plant products from West Texas and New Mexico to the company's refining operations at Borger, Tex. Furthermore, shipments of pipe are scheduled for early delivery for the looping program which the company has been carrying on along sections of the trunk line in Kansas and Missouri.

The system which is being laid west of Borger entails 237 miles of 8-in. and 54 miles of 6-in.; the entire program carried on by the company this year totals 544 miles of pipe.

Construction is being handled by O. E. Dempsey Construction Co. Field headquarters have been established at Hobbs, N. M., where 2 miles has been laid, and at Littlefield, Tex., where 10 miles has been laid.

Ajax Lays Loops for Trunk Line in Missouri

For the purpose of reducing pressure at points in Missouri, Ajax Pipe Line Corp. is laying two loops between Wentzville and Owensville, Mo. A 6-mile loop has been completed already and work is proceeding on the 3-mile loop between Springfield and Owensville, Mo. As a result of this looping program, it will be possible to effect a reduction of 25 lb. in the pumping pressure in a section of the trunk line. This will equalize pressures in a manner which is desirable for satisfactory operation. Pipe for the loops is being laid by Sheehan Pipe Line Construction Co.

Because of the great demands being made for moving crude oil northward, Ajax has been operating at capacity during the war period to move crude from its connection with Oklahoma Pipe Line at Glenn Pool, Oklahoma, to its terminus at Wood River, Ill.

Phillips Negotiates for Panhandle Eastern Line

Phillips Petroleum Co. and Missouri-Kansas Pipe Line Co. are reported to be negotiating a $10,000,000 deal with the Columbia Gas & Electric Corp. involving the purchase of Columbia's entire interest in Panhandle Eastern Pipe Line Co.

If the negotiations are successfully concluded it would settle one of the hardest fought battles ever waged in the utility industry.

The transaction involves the proposal of Phillips to purchase 404,326 shares of Panhandle Eastern for approximately $10,500,000. This stock is owned by Columbia Oil & Gasoline Corp., a subsidiary of Columbia Gas & Electric, and represents 50.1 per cent of the outstanding stock of Panhandle Eastern. Under the arrangement, Phillips would divide the stock equally with Missouri-Kansas Pipe Line, the two concerns financing the operation through bank loans. This would eliminate Columbia Gas & Electric from the "Mokan" and Eastern Panhandle picture completely.

Missouri-Kansas and Columbia have been in a controversy for years over ownership and operation of Panhandle Eastern, organized by Missouri-Kansas in 1928 and now owner of about 43 per cent of its outstanding stock against 50.1 per cent held by Columbia.

In 1936 the Department of Justice obtained a consent decree by which Columbia placed in the hands of a trustee its Panhandle Eastern holdings pending further action. "Mokan" has three suits pending against Columbia.

If the present deal goes through, Missouri-Kansas has agreed to drop all of these. Panhandle Eastern would receive considerable gas reserve acreage now owned by Phillips and Phillips would have an important outlet for its tremendous reserves of natural gas.

Panhandle Eastern serves approximately 750,000 customers in 200 communities, including Detroit.

CLASSIFICATION OF CRUDE OILS

THE CLASSIFICATION OF CRUDE OILS THROUGH LABORATORY ANALYSES NOW REQUIRED BY THE STATE AND FEDERAL REGULATORY BODIES IS FOR THE PURPOSE OF PRORATION AND PRIORITIES WHEN ORDERING DRILLING EQUIPMENT.

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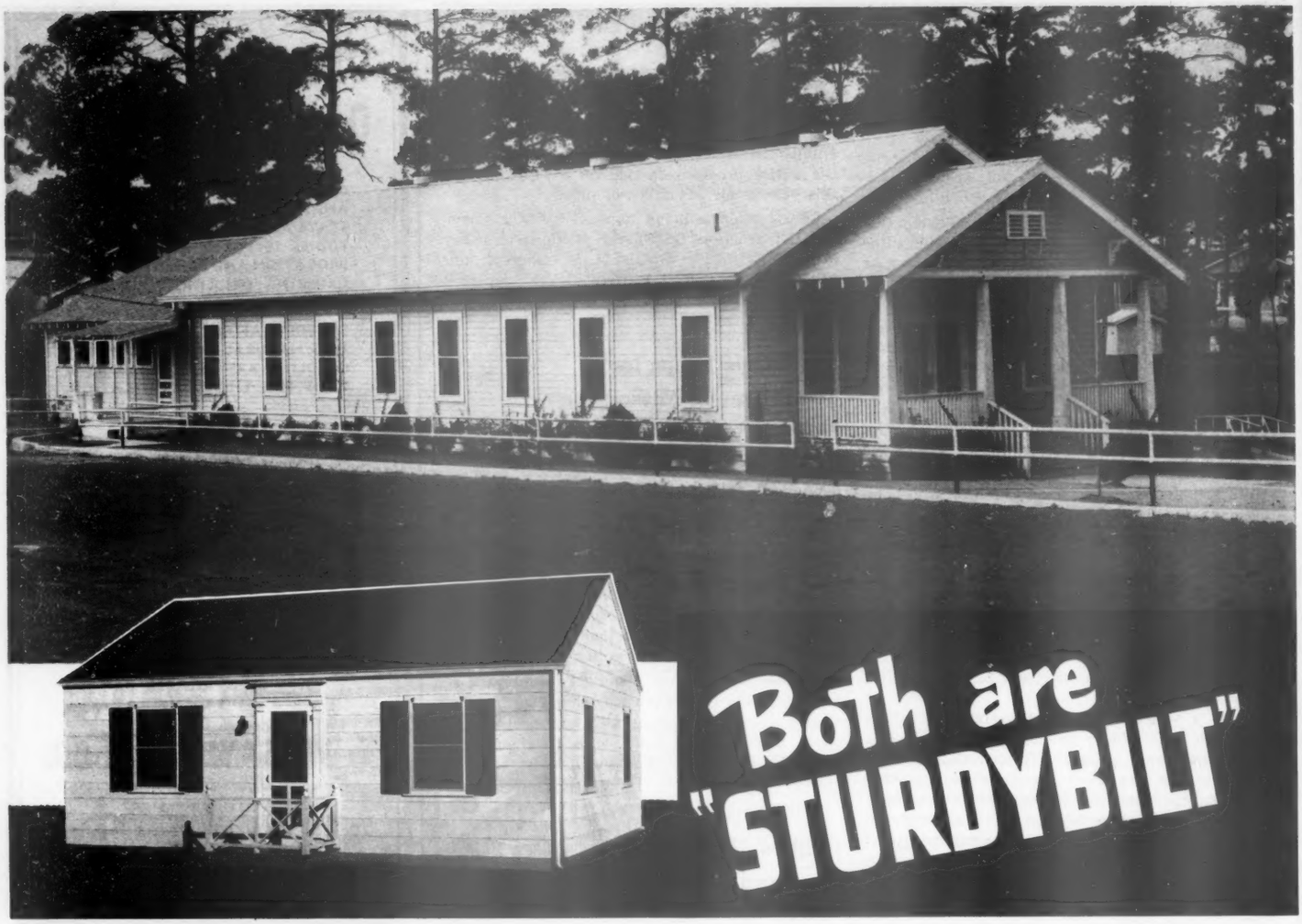

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FIELD DEVELOPMENTS...

HIGHLIGHTS FROM THE WEEK'S NEWS—

There are indications that drilling during the second half of 1942 will be slightly accelerated. At the present time, there is a noteworthy increase in locations, due to fear of greater restrictions in the future and a desire to get in under the wire. A more healthy sign, however, is the report that higher priority ratings are being given to development wells in some areas in addition to the high rating enjoyed by wildcats.

It is a well-known fact that there are more geophysical crews in the field than at any time during the past few years and this exploratory activity will undoubtedly result in the drilling of more wildcats and a probable increase in the discovery rate later in the year. The oil industry thus continues to make the best of a difficult situation and prepares to meet any emergency which may arise and with which it can cope.

The normal trend of activity tends to be diverted by efforts of legislators and others to introduce new ideas into the picture. There can be no objection to this so long as each idea fits into the general plan. The Petroleum Industry War Council exists to study the situation as it is today and to plan for the future. Its recommendations are passed on to OPC. The council represents all phases of the industry and all sections of the country. It is in a position to get the facts on any situation, whether those facts deal with the steel supply, the effect of rubber shortages on gasoline rationing, the tangled transportation system or the need for additional gas wells in the eastern Mid-Continent. The joint efforts of OPC and PIWC are apt to be hampered by insistence on the part of individuals that their business should be conducted as usual, by insistence on the part of some congressmen that their districts should receive favorable treatment. It would be very nice if, as a result of the war, everyone should be able to get all the materials he wants, make larger profits and pay fewer taxes. However, wars do not work out that way.

In deciding to lay a 24-in. line from East Texas to southern Illinois, OPC may or may not have the best solution of the transportation difficulty. It may merely be the best expedient at the present time. The question of shipping oil to the Atlantic seaboard has been studied in great detail by the Government and by the industry's representatives in Washington. Presumably, they have worked out a plan of getting the oil from the east end of the line to the coast. If so, it doesn't help much to insist that the east end of the line should be the west end, that the line should not start at East Texas but somewhere else and that a line across Florida, or Idaho or somewhere else will solve all of our troubles.

Similarly, the recent bill reserving a block of 75 miles wide and stretching from the mouth of the Mississippi to Calhoun County, Texas, for government ownership and operation may be an excellent idea but the fact that it was apparently introduced without the sponsorship of OPC and PIWC may indicate that another idea may be even better. The Government has not yet shown it has the qualifications to undertake a wildcat campaign of the scope envisaged by the author of the bill.

TEXAS GULF COAST: The fourth discovery in Jackson County this year is in prospect southeast of Ganado. A Wilcox test in the Glendale area, Trinity County, is preparing to test showings (p. 64).

ILLINOIS: McClosky production is reported southwest of Carmi, White County. In Jefferson County a wildcat showed oil in the McClosky after plugging back from the St. Louis (p. 67).

CALIFORNIA: A considerable increase is reported in the number of drilling wells, although footage is down as most of the activity is in the shallow heavy-oil fields. Yorba Linda, which is virtually a proven prospect, is slated for development in the immediate future (p. 57).

SOUTHWEST TEXAS: De Witt County's third Wilcox discovery made gas and distillate. After tests are completed, other potential pays will be tried out. Wilcox wells are planned for Gonzales and Karnes counties. The discovery well of the Poth pool, Wilson County, made only 4 bbl. on the pump from the Wilcox (p. 68).

LOUISIANA GULF COAST: A gas field has been brought in offshore from Iberia Parish. Oil and salt water is reported from a test of the Sparta sand on the flank of Pine Prairie (p. 64).

NEW MEXICO: A "mystery" gas has been found at 6,950 ft. on the Rattlesnake dome in San Juan County (p. 66).

EAST TEXAS: The second well in the Club Lake field is being drilled through the Woodbine and reports an unusually thick section. Showings have been found in the sub-Clarksville zone at Black Oak (p. 58).

OKLAHOMA: The Pauls Valley pool is limited on the south and southeast by dry holes. Navina is extended ¾ mile and Northeast Edmond is extended ¼ mile, both to the south (p. 59).

KANSAS: The Schweizer and central sectors of the Peace Creek pool have been extended (p. 65).

ALBERTA: A test at Pouce Coupe in the Peace Creek area is reported running 42 ft. higher than the gas well completed some years ago (p. 62).

MICHIGAN: A big well in the Dundee may open a new area north of Adams. A wildcat in Ottawa County made a small well and may open a new pool (p. 63).

WEST TEXAS: Andrews County maintains its interest with a new pool showing 13 miles west of West Andrews and a possible link between Mascho and West Fuhrman. Abell has been extended to the south. The Keystone lime pool is to have an Ordovician test (p. 60).

COMPLETIONS IN ALL FIELDS . . .

(Week Ended July 4, 1942)

	Oil	Gas	Dry	Total	Footage	Ttl. comp. to date 1942	Ttl. comp. to date 1941
N. Y., Pa., and W. Va.	43	24	1	68	125,120	1,856	2,761
Ohio	6	14	8	28	70,970	517	835
Indiana	1	1	10	12	17,004	188	246
Kentucky	1	4	2	7	16,805	175	351
Illinois	14	0	10	24	58,097	853	1,702
Michigan	6	3	4	13	30,561	361	427
Kansas	13	1	14	28	86,848	775	996
Nebraska	0	0	1	1	2,750	21	48
Missouri-Iowa	0	0	0	0	0	9	10
Oklahoma	8	0	11	19	56,306	670	794
Texas:							
North Central Texas	8	0	11	19	58,451	648	1,470
West Texas	16	0	3	19	82,642	830	1,045
Texas Panhandle	6	2	0	8	23,536	226	280
East Texas	3	0	1	4	24,486	206	574
Texas Gulf Coast	6	1	2	9	56,691	429	551
Southwest Texas	5	1	8	14	68,076	670	900
Total Texas	44	4	25	73	313,882	3,009	4,820
North Louisiana	6	0	2	8	34,921	256	307
Louisiana Gulf Coast	7	0	5	12	111,016	293	458
Total Louisiana	13	0	7	20	145,937	549	765
Arkansas	2	0	0	2	13,879	77	95
Mississippi and Southeast	1	0	1	2	8,930	45	132
Montana	2	3	0	5	7,752	86	123
Wyoming	2	0	0	2	4,913	49	68
Colorado, Utah	1	0	2	3	7,537	8	19
New Mexico	2	0	2	4	10,749	148	243
California	9	1	4	14	74,317	406	536
Total United States	168	55	102	325	1,052,357	9,802	14,961
Total previous week	164	25	121	310			
Week ended July 5, 1941	437	67	159	663			

South Kansas Discoveries Open Shallow Pennsylvanian Trend

DISCOVERY of the third Pennsylvanian producing area in northern Barber County this week focused interest on shallower horizon possibilities on the south flank of the Central Kansas uplift.

Finding of Lansing-Kansas City lime production in the Lake City field proves a new trend existing from Sun City on the northwest to Medicine Lodge on the southeast along a front 20 miles in length. To date two oil wells have been completed from the Lansing series in the Sun City field with bottom-hole pressure potentials in excess of 6,000 bbl. of 34° crude. At Whelan, high-pressure gas was obtained in the Elgin sandstone in the Pennsylvanian system.

Lake City Pennsylvanian

At Lake City, the new Pennsylvanian discovery is that of Ralph J. Pryor and Floyd E. Lockhart, Inc., 1 Vanderplas, N½ NW SE 18-31-13w. The well, situated ½ mile southwest of present production, was originally completed on March 6, 1940, as a dry hole at a total depth of 4,620 ft. in the Arbuckle dolomite topped at 4,604 ft. This summer, operators went back into the hole with a cleaning-out machine and ran an electric log in the expectation of logging favorable porosities and resistivities opposite the Massey zone which marks the Pennsylvanian production in the Massey field near Sun City. Accordingly, operators set 5-in. casing at 4,354 ft. and cemented at that depth.

Following perforations with 92 shots from 4,190 ft. to 4,205 ft., operators cleaned the well out and after letting it stand for 9 hours, oil rose 475 ft. with 32° oil and a small showing of mud and water. This zone is 425 ft. in the Lansing-Kansas City lime series topped at 3,765 ft.

The Lake City field was originally discovered on June 20, 1937, by same operators in 1 Joseph L. Gant, C SE 7-31-13w, which was completed for an initial potential of 1,351 bbl. of oil, after acidization in the Viola lime topped at 4,433 ft. and drilled to 4,438 ft., total depth.

The Sun City field, situated 10 miles to the northwest, which produces also from the Pennsylvanian system, was opened on December 3, 1941, by Wilton J. Coppinger and associates. Their 1 Massey, E½ NE NW 35-30-15w, drew an initial potential of 6,112 bbl. by bottom-hole pressure method. Originally, this discovery was drilled to a total depth of 4,719 ft. in the Arbuckle dolomite topped at 4,676 ft. but was plugged back and shot opposite the Pennsylvanian after the Ordovician strata proved barren. During June, the east offset to the discovery was likewise completed for a 6,043-bbl. potential oil well from the same horizon at Great Lakes Carbon Co. 1 Shutts, NW NW NE 35-30-15w, from 4,289 ft. to 4,297 ft. in the Lansing-Kansas City lime series topped at 3,849 ft., or 440 ft. below the top of the formation.

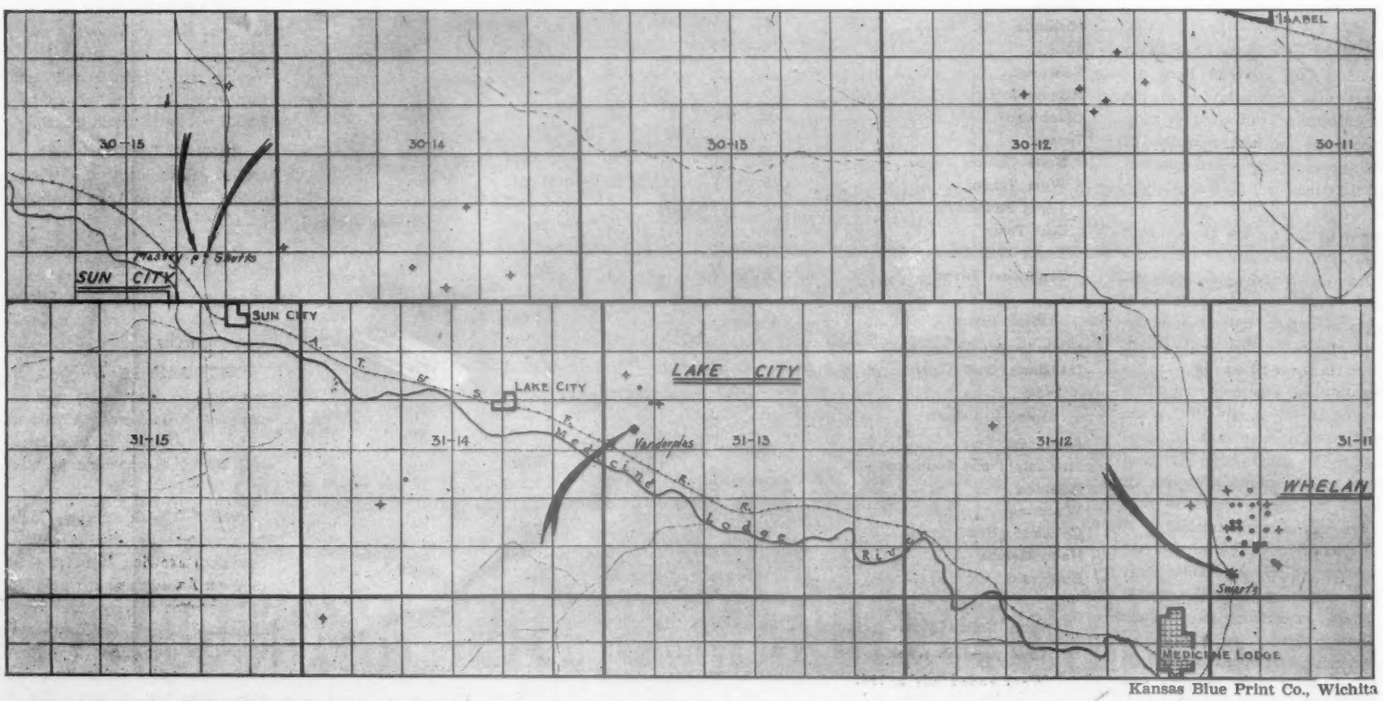
SUMMARY OF GEOLOGICAL DATA — PENNSYLVANIAN DISCOVERY WELLS, NORTHERN BARBER COUNTY, KANSAS

	Pryor & Lockhart 1 Vanderplas (Lake City-K. C.)	Coppinger 1 Massey (Sun City pool)	Great Lakes 1 Swartz (Whelan-Elgin)
Location	N½ NW SE 18-31-13w	E½ NE NW 35-30-15w	NE SW 31-31s-11w
	Feet		
Elevation	1,621	1,787	1,498
Top Topeka	....	3,065	....
Top Lansing	....	3,907	3,695
Top Mississippian	....	....	4,271
Base Mississippian	4,340	....	....
Top Viola	4,391	4,501	4,521
Top Simpson dolomite	4,510	4,596	....
Top Simpson sand	4,535	..	....
Top Arbuckle	4,604	4,676	
Total depth	4,620	4,719	4,619
Name of producing horizon	Lansing-K. C.	Lansing-K. C.	Elgin sandstone

Elgin Sand at Whelan

The third Pennsylvanian sand discovery well of this new trend is ½ mile south of the Whelan (Mississippian chat) pool near Medicine Lodge. It is Great Lakes Carbon Co. 1 Swartz, NE SW 31-31-11w, which was completed from the Elgin sandstone for an initial potential of 3,900,000 cu. ft. of gas under a casinghead rock pressure of 1,300 lb. Original total depth was 4,619 ft. with the Viola lime topped at 4,521 ft.

Methods of exploration for Pennsylvanian objectives include subsurface geological mapping, running of electrical well-logging surveys on deep dry holes in and flanking known producing areas, and checking of old well log records. Use of time logs in determination of significant variations in drilling time in the Pennsylvanian is fast becoming a common practice in western Kansas oil exploration and development.



Kansas Blue Print Co., Wichita

Map of northern Barber County with new Pennsylvanian producing areas indicated by arrows in the Whelan, Sun City, and more recently the Lake City fields

Wheatville Discovery Makes Good Flow on Test

By L. P. STOCKMAN

LOS ANGELES, Calif.—In the Wheatville section of Fresno County, Amerada Petroleum Corp. 4-6 Truman in 6-17s-18e, tested wet on a preliminary test a short time ago but this trouble is believed to have been overcome by a cement plug put in bottom of the hole. Prior to showing water the well flowed for a limited period at a daily rate of 168 bbl. of 60-gravity oil and 6,000,000 cu. ft. of gas. Previously it showed only gas. At Helm, Riverdale and Wheatville the discovery wells have been located in gas-cap areas and consequently as wells are drilled down structure gas volume may be substantially less and crude-oil production higher. Raisin City, however, a Shell Oil Co., Inc., discovery, the oil measures appear to be quite thin and very lenticular with a marked unconformity in subsurface strata.

Jergins Oil Corp., in abandoning 3 Cheney ranch in lower Moreno at 7,703 ft., as the company found production in only one well which flowed at a daily rate of about 10 bbl. of 60-gravity oil for several months. The current abandonment looked quite good in the upper part of the hole when it correlated 500 ft. higher structurally than 1 Cheney ranch, the discovery well, but the Cheney oil sand at this point consisted of gray sand and shale. Two formation tests were made in 3 Cheney ranch, one with bottom at 4,003 ft. and a second at 5,966-6,044 ft., but nothing of a promising nature was secured. The absence of the productive Cheney oil sand beneath 3 Cheney ranch may reflect faulting or the changing of the sand section to shale and the abandonment of the last well leaves very little hope for the Panoche district as far as substantial production is concerned. All three wells were bottomed in the Upper Cretaceous.

Trico Oil & Gas Co., which recently extended the productive limits of the Delano gas field in the San Joaquin Valley, has concluded drilling operations on 1 T.W.A. fee in 16-24s-23e, and a production test is now being made. Trico Oil & Gas Co., which discovered the Delano gas field several years ago, resumed drilling operations in this field a few weeks ago. Along the west side of 17-24s-23e the company drilled a dry hole on the Lee Community lease and then moved to the east side of the same section and completed 2 Lee Community as a good flowing gas well. These two wells are the most northerly drilled in the Delano gas field up to date. Next the company moved farther east and in Section 16 has finished 1 T.W.A. fee. The first Mya gas zone was cored at 2,472 ft. and the so-called B zone was topped at 2,486 ft. The company's 2 Lee Community and 1 T.W.A. fee have extended the northern limits of production in the Delano gas field and a further extension would not be at all surprising. The productive interval in the Delano gas field is lenticular and not at all regular throughout the field as the Mya gas sand pinches out at some points and feathers out at others. Because the productive capacity of wells varies from one location to another, the drilling of one dry hole does not necessarily mean that commercial production could not be developed a few hundred feet away. Tide Water Associated lost its attempt to develop commercial gas production on Bethel Island in the Delta region of the Sacramento River in Contra Costa County and the hole at 4,975 ft. is being abandoned. Texas Co., however, has filed notice of intention to drill a gas well on the Henderson property, 33-16s-12e, in San Benito County, about 5 miles southeast of a location staked for a new gas test by Union Oil Co. in 13-16s-11e.

Drilling Increases in June

A check of drilling operations for the month of June 1942 indicates that the number of strings of tools in operation greatly exceeded those turning during March, April, and May of this year but figures sometimes reveal many interesting things. The real reason for the apparent substantial increase in drilling is the fact that operators are drilling many small shallow wells in search of commercial production of heavy crude oil to meet refinery needs for fuel oil. Many of the shallow wells now being drilled have oil sands as their objective from 700 ft. to 1,800 ft. as compared with 8,250 to 11,500 ft. a few months ago. The present total number of drilling wells is larger but the total footage drilled in the shallow fields barely exceeds 10 per cent of the total footage recorded when operators were aggressively developing Rio Bravo, Ten Section, Coalinga, and other similar fields where the pay is relatively deep. At present operators are aggressively drilling for shallow production in the Kern River, Coalinga, South Belridge, Midway-Sunset, Mount Poso, Round Mountain, and Edison. This shallow production, due to lower drilling costs and unrestricted production allowables for heavy grades of crude oil, makes this development very attractive especially because of the high demand for fuel oil to meet requirements of railroads, commercial establishments, and naval demand for bunkers and other requirements. A much higher demand for fuel oil is anticipated during the next several months and if certain things happen the demand on the Pacific Coast for fuel oil might exceed the highest peak ever reached and severely tax the capacity of operators to meet the demand.

SAN JOAQUIN VALLEY COMPLETIONS

Bethel Island wildcat district, Contra Costa County: Tide Water Associated Oil Co. 1 Bethel Community, 9-2n-3e, abandoned as unproductive, T.D. 4,975 ft., dry shale 4,975 ft.

Coalinga, East, Fresno County: Standard Oil Co. 43-23-A fee, 23-19s-15e, dry, T.D. 3,896 ft., Kreyenhagen 2,842 ft., Hondo shale 3,883 ft.

Coalinga, West, Fresno County: Texas Co. 1-C Pleasant Valley Farming, 6-20s-15w, pumped 34 bbl., 16.9-gravity, 1 per cent cut, T.D. 2,128 ft., perf. 2,031-2,128 ft., completed in shallow Pliocene zone.

Greeley, Kern County: Standard Oil Co. 11-33 Kern County Land, 18-29s-26e, flowed 1,890 bbl., 34.4-gravity, 0.5 per cent cut, 1,810,000 cu. ft. gas, pressures 1,040/1,225 lb., T.D. 11,510 ft., perf. 10,484-10,509 ft., completed in Vedder zone 11,423-11,510 ft., Rio Bravo zone 11,393 ft. blanked off and not produced.

Midway-Sunset, Kern County: Standard 110-35-B fee, 35-31s-23e, pumped 25 bbl., 25.8-gravity oil and 4 bbl. water, T.D. 3,145 ft., perf. 2,882-3,140 ft., in Midway zone (Pliocene).

Texas Co. 105 American fee, 36-31s-22e, pumped 12 bbl., 15.9-gravity, 5 per cent cut, T.D. 1,238 ft., P.B. 1,190 ft., perf. 1,118-90 ft., in upper Pliocene.

Mount Poso, Kern County: D. G. Vedder 29-2 Glide, 29-27s-28e, dry, T.D. 2,361 ft., Vedder Oil zone consisted of gray water sand.

Panoche wildcat district, Fresno County: Jergins Oil Corp. 3 Cheney Ranch, 30-14s-13e, dry, T.D. 7,703 ft., in lower Moreno formation.

Riverdale, Fresno County: Amerada Petroleum Corp. 38-23 Zanolini, 23-17s-19e, flowed 200 bbl., 36.8-gravity, 0.2 per cent cut, 105,000 cu. ft. gas, flow pressure 350 lb., T.D. 6,840 ft., perf. 6,804-40 ft. in Lawton zone (Miocene age).

Development in Prospect In Yorba Linda

It is believed quite probable that Los Angeles Basin will have a new oil field within the next few weeks if Shell Oil Co., Inc., proceeds with its announced intention of undertaking drilling operations in the Yorba Linda district of Orange County. In 1937 Shell Oil Co., Inc., drilled a series of core holes in 16-3s-9w and one of them flowed at a daily rate of 766 bbl. of 20.2-gravity oil cutting 1.4 per cent sand and 276,000 cu. ft. of gas from the comparatively shallow depth of 2,325 ft. This core hole was shut in immediately subsequent to completion and was never produced. This large flow was somewhat unexpected although Shell's field department knew they had a good well in the making. As a result of this showing, Shell Oil Co., Inc., bought fee title to about 2,000 acres of potential oil land from Olinda Land Co. for a consideration of $500,000 and after taking possession was in a position to suspend further operations. Because this was a core hole and not officially listed as a completion it has not been reflected in reserve data nor listed as a proved field. Shell's new drilling project in the Yorba Linda district will be 26-15 Olinda fee and it will be drilled in 15-3s-9w, less than 1 mile east of the company's core-hole discovery which was in 16-3s-9w. Structural conditions remain to be determined but it is quite likely that the Yorba Linda field will be an accumulation against a fault as is the case with many of the other fields in that immediate locality.

Buena Park Wells Testing

Texas Co. should be able to get some idea within the next few weeks about the future prospects of the Buena Park field of Orange County which it discovered a few months ago as both of the two wells that the company is drilling in that field have reached the critical depth. West of 1 Spencer, the discovery well, Texas Co. is making a formation test of 4-1-E Buena Park in 36-3s-11w, and from 9,312-44 ft. in the equivalent of the Bell zone of Pliocene age secured a slight blow and some crude oil. Production appeared to be building up and it might be possible that the company will get a commercial producer upon the conclusion of drilling. This well, as has been expected, is running substantially lower on the structure than the discovery well but appears to be showing more kick. It remains to be seen what it will make when completed. East of the discovery well, the company's 1-1 Buena Park Unit is being plugged back from 8,880 ft. to test out a 50-ft. interval that contained some oil sand around 8,450 ft. This well is higher structurally than either 1 Spencer, the discovery well, or the outpost located west of present production. The Bell oil sand found at Buena Park is not especially thick or prolific, based on the results of drilling to date, and for this reason the real significance of this field remains to be determined in the future.

Third Turnbull Canyon Well to Whipstock

At Turnbull Canyon, Continental Oil Co. has given up the attempt to finish 3 Turnbull Community below its present surface location and has plugged back to 1,035 ft. to redrill and whipstock the hole to the south. This well is the most northerly hole drilled in the Turnbull Canyon field by Continental Oil Co. and it failed to find anything except a few thin streaks of oil sand in the field's productive interval. When drilling operations were started in this field it was believed that the structure was a plunging nose cut off by a fault but in view of the results of drilling there now exists some doubt as to the ac-

(Continued on Page 65)

NORTH CENTRAL TEXAS

Young County Mississippi Lime Discovery Dry in Ellenburger

By ROBERT INGRAM

WICHITA FALLS, Tex. — Ellenburger was found dry last week at the new Mississippian lime pool in western Young County recently opened by Shell Oil Co., Inc., 1 Bullock, Block 343, T.E.&L. Survey, 7 miles northwest of Newcastle. The discovery well had been drilled on past the productive Mississippian zone to the Ellenburger, topped at 4,792 ft. and drilled to 5,001 ft. On a test of the Ellenburger, with packer set at 4,966 ft., the hole showed a little gas while swabbing, but after being treated with acid at 4,910-17 ft., it made a heavy flow of salt water.

At week's end the well was plugging back to the Mississippian pay at 4,753-4,837 ft. where it showed for 50 bbl. an hour natural.

Largely on the strength of the showing at this well, Ben H. Rankin et al staked location for 1 M. K. Graham, Section 2907, T.E.&L. Survey, 1 mile north of Murray in Young County and 10 miles south of Shell 1 Bullock. The well is also 3 miles southwest of the 4,928-ft. failure drilled last year by Fleming & Kimbell Oil Corp. which had shows in the Caddo, Marble Falls, and Missippian.

Jack Ellenburger Discovery

Jack County's Ellenburger discovery, Taubert & McKee 1 Boyd, Seth H. Hazel Survey, 3 miles south of Post Oak, gave indication last week of finally having achieved a water shutoff. Early in the week, a series of squeeze jobs began after water encroachment first showed, casing was perforated with 30 shots from 6,408-18 ft. and the section treated with 5,000 gal. of acid, the well began flowing oil with no water. The flow was started after tubing was pulled by running a swab several times. Gas blew the swab up the hole to the crown block.

Next day tubing was rerun and the test flowed a few minutes, then would not flow through the tubing. Valve on the casing head was opened and the well began to flow, making 51 bbl. of oil with no water in 2½ hours. Operators continued tests before taking a potential.

Throckmorton Well Heads for Mississippian

British American Oil Producing Co. 1 McCluskey, Block 263, B.B.&C. Survey, 4 miles northwest of the town of Throckmorton in Throckmorton County, was drilling below 5,020 ft. seeking the Mississippian after it had a show in the Caddo the previous week. The well topped the Caddo at 4,556 ft., and on a 37-minute drill-stem test at 4,615-39 ft. recovered 120 ft. of oil-cut mud.

Meantime, Amerada Petroleum Corp. 1 Annie Williams, Cassell Survey, 2 miles southwest of Spring Creek in Throckmorton County, was to be abandoned after going through the Ellenburger with no shows. It had topped the Caddo at 4,550 ft., the Mississippian at 4,925 ft., and the Ellenburger at 5,135 ft. It was drilled to 5,478 ft.

The prospective K.M.A. lime discovery in Archer County, George Cooper 1 Knight, Block 69, Wichita Valley Farm Lands, 1 mile west of Holliday, was drilling below 4,520 ft., apparently headed for the Caddo. Previous week the well was showing for a producer at 4,110-24 ft.

NORTH CENTRAL TEXAS COMPLETIONS

Wildcats

Cooke County: Lou G. Stogner 1 Ray Berry et al, Berry 82-acre lease in T. B. Hardwick Sur., A-1599, 1½ mi. N of Rosston, dry, Ellenburger 5,920 ft., T.D. 6,003 ft.

Throckmorton County: Humble 1 J. O. Crump, NW NW Sec. 956, T.E.&L. Sur., 4½ mi. NW of Woodson, junked, T.D. 4,056 ft.

Young County: Panhandle Refining and Rankin 2 Slater, SE SE Sec. 3406, T.E.&L. Sur., 5 mi. NW of Graham, dry, T.D. 4,158 ft.

Fields

Harrold, Wilbarger County: Big 6 Oil 1 C. Morris, N 50 acres of W 95 acres of SW Sec. 3, Blk. 14, H.&T.C. Sur., dry, T.D. 3,413 ft.

James, Young County: Ben H. Rankin and Elliott Production 1 W. J. Sanders, SW SW Sec. 1963, T.E.&L. Sur., flowed 76 bbl. oil and 250 bbl. water, lime 4,074 ft., T.D. 4,083 ft.

Scott & Graham 3 Williamson-A, NE NE Sec. 458, T.E.&L. Sur., old well, deepened to 4,929 ft., P.B. to 3,950 ft. in original pay, 10 bbl. potential.

Potts-Ellenburger, Wilbarger County: Consolidated 5 Potts-D, NW NW Sec. 4, Blk. 7, H.&T.C. Sur., flowed 279 bbl. in 10 hr. through ¾-in. choke, acid, pay 4,506-30 ft., T.D. 4,544 ft.

Consolidated 6 Potts-D, SW NW Sec. 4, Blk. 7, H.&T.C. Sur., location abandoned.

Ross, Clay County: Continental, Superior, and Dillard 4 Avis estate, 2,478 ft. from S line and 660 ft. from E line of Rains C.S.L. Sur., A-774, flowed 265 bbl. after acid, pay 5,354-5,480 ft., T.D. 5,500 ft.

Thornberry, Clay County: George G. Golden 8 Mrs. K. Engart, Lot 7, Thornberry subd., dry, T.D. 1,172 ft.

E. C. Harlin, Jr., 1 Mrs. D. E. Bentley, Lot 54, Specht & McCutchen subd., dry, T.D. 1,200 ft.

Miscellaneous

Montague County: Walter H. Gant 1 J. T. Brown et al, Sec. 58, E.T. Sur., A-299, dry, T.D. 504 ft.

Young County: J. G. Darden 1 S. A. Stowe, NW NW Sec. 228, T.E.&L. Sur., dry, T.D. 1,098 ft.

New Pool in Prospect Between Wimberly and Merkel Pools

FORT WORTH, Tex. — Midway between the Wimberly pool in Jones County and the Merkel pool in Taylor County, Butler & Horne 1 Hudson, Lot 1, Section 9, Nabers Survey, was considered a possible new pool opener. The well had shows in six zones, at 2,408-14 ft., 2,437-45 ft., 2,460-62 ft., 2,468-70 ft., 2,473-85 ft., and 2,507-12 ft. The deepest zone was considered the most likely to produce, but failing this, operators will deepen to test lower horizons.

Meantime, about 3 miles southeast of Truby in Jones County, Merry Brothers & Perini et al were preparing to start 1 J. W. Gorgan, wildcat, with plans to go to 2,350 ft. In the Wimberly pool, latest completion was Maracaibo Oil 1 Church, which flowed 158 bbl. in 3 hours.

(Continued on Page 67)

EASTERN TEXAS FIELDS

Find Thick Woodbine Section At Club Lake, Hunt County

By ROBERT INGRAM

DALLAS, Tex.—As final gage was taken on the discovery well of the Club Lake field near Greenville in Hunt County, the second well, Hollandsworth Drilling Co. 2 Baker, Warren Survey, north offset to the discovery, was drilling in Woodbine pay sand and was reported to have logged an unusually thick section. The discovery well drilled only 20 ft. into the sand, and it was understood that the operators would go through the section in their second well.

The No. 2 was credited with topping the oil sand at 2,750 ft., or about normal with the discovery.

Meantime, a wildcat more than 2 miles southwest, the Dick Andrade 1 Schenck, Lathan Survey, was drilling below 2,655 ft. (last announced depth) and was rumored to have gone 5 ft. into the sand. Since the well had topped the Austin chalk at 2,210 ft., the rumors indicated that a fault had been cut to bring the Woodbine in near normal with the discovery.

While these wells stood fair to make big news in the area, Germany and Prince 1 Miller, C.C.I &C. Survey, nearly 2 miles northeast of the discovery, was drilling below 925 ft. in shale. Grelling & Hughes 1 Graham, Hart Survey, was below 1,500 ft. in shale, and Hollandsworth 3 Baker, Warren Survey, southeast of the discovery, was close to the sand but no depth was given.

Sub-Clarksville Shows at Black Oak

Possibility of a second pay zone at the new Black Oak Paluxy sand discovery in Wood County was seen as Jerry Hawkins 1 Clark, Smith Survey, northeast outpost to the pool, had a show of oil in the sub-Clarksville at 4,070 ft. Other tops, from elevation of 547 ft., were: Pecan chalk, 2,540 ft.; Austin chalk, 3,920-4,055 ft., base of which would place the well about 60 ft. high to the discovery.

Meantime, an attempt to spread the field about 2 miles north and east into Hopkins County was reported in the making under a deal worked out by B. F. Phillips of Gladewater and others. According to information from the area, the well is to be located on the A. U. Bullock 56-acre tract in the John Clayton Survey. Four other wells are drilling in the field.

Exploration Starts Near Chapel Hill

Location was staked and derrick was up for Sinclair Prairie 1 W. F. Swinney, 489 ft. from the north line and 891 ft. from the west line of the tract in the W. Lockhart Survey, A-563, 2 miles southeast of the Chapel Hill field in Smith County. Sinclair had also staked 2 Welton, J. Wolfe Survey.

EAST TEXAS COMPLETIONS

Wildcats

Hunt County: Hollandsworth Drilling 1 J. D. Baker et al, John Warren Sur., flowed 266.12 bbl. through ¼-in. choke, Woodbine 2,762 ft., T.D. 2,778 ft., *discovery.*

Fields

Chapel Hill, Smith County: Sinclair Prairie 1 W. A. Mullican, Matthew Arnold Sur., flowed 347 bbl. through ¼-in. choke, Pettit porosity 8,218 ft., T.D. 8,350 ft.

Sinclair Prairie 1 J. M. Olson, Matthew Arnold Sur., flowed 383 bbl. through ½-in. choke, Pettit porosity 7,719 ft., T.D. 8,358 ft.

Hawkins, Wood County: B. F. Phillips 1 J. A. Snider, dry, Woodbine 4,742 ft., T.D. 5,000 ft.

Dry Holes Limit Pauls Valley On South and Southwest

By CARL HOOT

POSSIBLE limitation of the Pauls Valley pool to the south and southwest with development going east of the discovery well was indicated when Pure's 5 and 6 Teter were completed dry at 4,526 ft. and 4,329 ft., respectively. Both wells found a thick section of Viola lime over the Wilcox sand, making them too low to produce. The 5 Teter is a southwest offset and the 6 Teter is ½ mile south of the discovery well. No. 4 Teter, SE SE NW 31-4-1, an east offset to the 1 Teter, flowed 427 bbl. of oil in 4 hours through choke from the Wilcox sand at 4,016-44 ft. One-quarter mile east of the 4 Teter, operators had set tubing after drilling to 4,044 ft. at the 1 Cashion-Teter and were preparing for completion tests.

The new Navina, Layton sand pool, of Logan County had prospects of a ¾-mile south extension in Cities Service 1 Underwood, SW corner 11-15-4w, which was cleaning out plugging back to Layton sand at 5,100 ft. Total depth was 6,747 ft. It will be the fourth well for the field, all of which have been drilled to the Wilcox and then plugged back to Layton sand found at an average depth of 5,000 ft. The same company's 1 Cronkite, SE SE 3-15-4w, was last reported drilling below 4,000 ft. It will broaden the field on the northern end. Drilling is under way at 1-B Cavanaugh, a ¼-mile east extension in SW SE SW 2-15-4w.

Northeast Edmond Enlarged

In Oklahoma County the Northeast Edmond pool, developed by Harper & Turner, gained a ¼-mile south extension in the company's 6 Harper, NW SW SE 17-14-2w, which flowed 43 bbl. of oil from Bartlesville sand topped at 5,820 ft. A recent enlargement was granted by the Corporation Commission. The pool now comprises all of Sections 7 and 8, the west half of Section 9; the west half of Section 16 and all of 17, 18, 19 and 20 of 14n-2w.

In the East Watchorn area of Pawnee County Alma Oil Co. was nearing completion of its 1 Swallow, a west offset to the discovery well. At 3,900 ft. the hole filled with oil and the crew was setting tubing. The new field now has five tests under way, including the 1 Swallow and the 1 Oldham, a northwest offset, both of which will be completed within a few days. New locations expanding the field were: Aladdin Petroleum 1 Swearingen, NE SE SE 23-23-3, ½ mile northwest of the discovery; 2 Deroin, SW SW NW 25-23-3, a south offset and the 1 Wentz, SW SE NE 26-23-3, ½ mile to the southwest. Pay zone in this new pool is the Wilcox sand found from 3,888 ft. to 3,900 ft.

OKLAHOMA COMPLETIONS

Wildcats

Harmon County: Jordan 1 Hart, NE NE 24-5-26w, dry, T.D. 3,510 ft., dolomite 2,980 ft., limestone 3,140 ft.

Jackson County, NE of Altus: Smith 1 Mock, NW NE NW 23-2-20w, dry, T.D. 2,650 ft., limestone 1,891 ft.

Kiowa County: Stauffer 1 Mayo, NE NW 13-6-18w, dry, T.D. 1,710 ft., sand with show of gas 550-65 ft.

Pontotoc County: Selby Oil 1 Busby, NW NE NW 18-4-5, dry, T.D. 2,073 ft. in Simpson, Dense 1,864 ft., dolomite 1,874 ft.

Love 1 Luther, NW NE SE 15-4-6, dry, T.D. 1,433 ft.

Fields

Ada, East, Pontotoc County: McBride 1 Peters, SE NW SE 8-4-7, dry, T.D. 1,268 ft.

Brooksville, Pottawatomie County: Atlantic Ref. 1 Ewton, SW SW 34-9-3, flowed 533 bbl. in 13 hr., Hunton 4,770 ft., T.D. 5,139 ft.

Dilworth, Kay County: National Union 5 Hockman, NE SE SE 19-28-1, abandoned location.

Earlsboro, West, Pottawatomie County: Anderson-Prichard 2 Nadeau, SE SW 19-9-5, flowed 100 bbl., Hunton 4,124 ft., T.D. 4,130 ft.

Edmond, Northeast, Oklahoma County: Harper & Turner 6 Harper, NW SW SE 17-14-2w, flowed 43 bbl., Bartlesville sand 5,820 ft., T.D. 5,849 ft.

Empire, Stephens County: Don 4 Trout, NE NW SW 1-2s-8w, pumped 7 bbl., sand 1,480-86 ft.

Pauls Valley, Garvin County: Pure 6 Teter, SE SW SW 31-4-1, dry, T.D. 4,329 ft., Viola 4,010 ft., sand 4,322 ft.

Pure 5 Teter, SE NE SE 36-4-1w, dry, T.D. 4,526 ft., P.B. 4,212 ft.

St. Louis, Pottawatomie County: Vierson 1 Duncan, NE SE SE 21-8-4, flowed 274 bbl. in 12 hr., Hunton 3,946 ft., T.D. 3,984 ft.

Vernon, Kay County: Clipper 1-A Klink, NW NW 21-29-1, pumped 109 bbl., Mayes 3,390 ft., T.D. 3,448 ft.

Miscellaneous

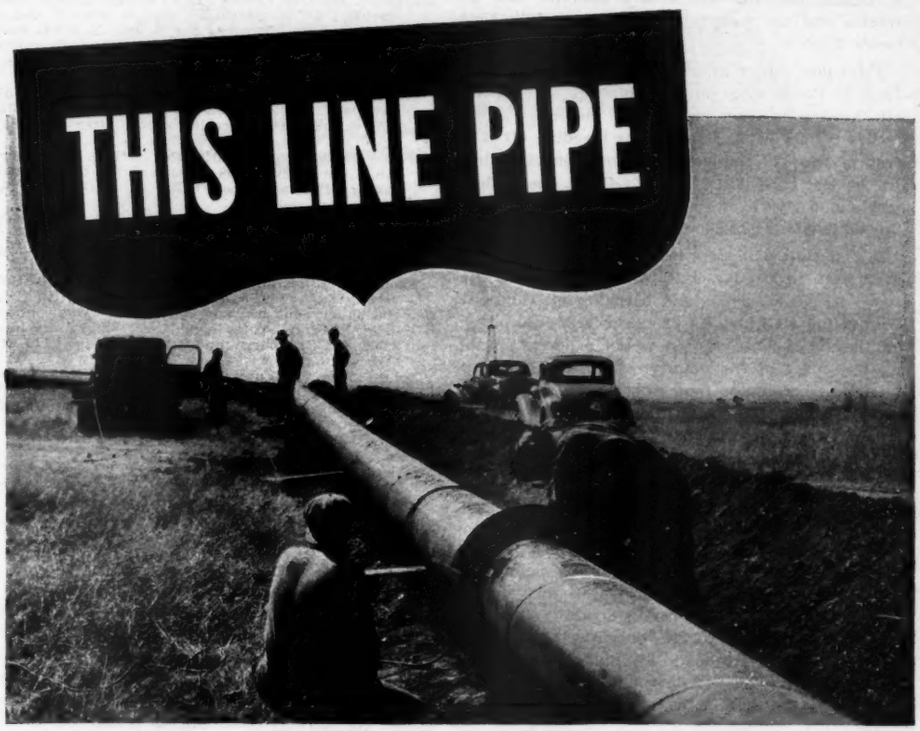
Creek County: Las Tecas 1 Jackson, SW SE 9-18-9, dry, T.D. 1,695 ft.

Tibbens 1 Abraham, NW NE 19-14-9, dry, T.D. 2,862 ft., swabbed 15 bbl. oil and 70 bbl. water from 1,250 ft.

Mid-Continent 4 Bear, SE NW SE 3-14-7, flowed 24 bbl. oil and 22,000,000 cu. ft. gas, Bartlesville sand 3,089 ft., T.D. 3,137 ft.

Sinclair Prairie 21 Yarhola, S½ NW 9-17-7, T.D. 517 ft., lost hole.

Seminole County: Kerlyn 1 Washington, NE SW NW 8-8-7, dry, T.D. 4,486 ft.



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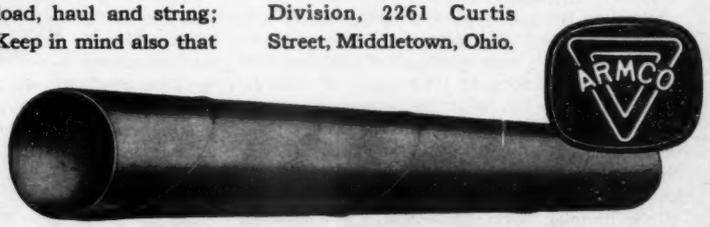

ARMCO Spiral Welded Pipe

New Pool in Sight in West Central Andrews County

By ROBERT INGRAM

MIDLAND, Tex.—Another new Andrews County pool was in the offing last week at Atlantic Refining Co. 1-A Texu, Section 9, Block 12, University Survey, 13 miles northwest of the West Andrews field in the west central part of the county. However, early tests did not show sufficient pay for completion attempt, and at week's end the well was drilling ahead in lime below 7,195 ft.

First good show came after a drilling break at 7,076 ft. Cores were pulled beginning at 7,084 ft., all showing at least stains, and the top 5 ft. of a core from 7,104-21 ft. was lime bleeding oil. The rest of the 13 ft. recovered, however, was dry. In the last core taken, at 7,121-41 ft., the middle had about 1½ ft. of sandy lime and shale bleeding with slight porosity.

A 45-minute drill-stem test at 7,066-7,150 ft., however, returned only 30 ft. of drilling fluid, the top 5 ft. cut with gas and carrying oil rainbow. Should the well make a producer, it would prove another in the series of new pools in the southwestern part of the county which are likely to be joined before too long into a large field similar to Slaughter. Goldsmith and other West Texas fields.

Link for Andrews Pools

Linking of the new Mascho Permian lime pool of southwestern Andrews County with the new Permian lime pool opened approximately 2 miles south of the West Fuhrman pool by Seimoneit Drilling Co. of Fort Worth was indicated by Skelly Oil Co. 1-H University, Section 14, Block 10, University Survey. The outpost, bottomed at 4,888 ft. in lime, swabbed 11½ bbl. of fluid in 24 hours through 2-in. tubing, cut 4 per cent b.s. and 4 per cent drilling water.

After acid treatment, the well was to be given a pumping test for potential.

Three More Locations at West Andrews

Atlantic Refining Co. staked locations for three more Permian lime tests south of the West Andrews pool and west and northwest of Phillips Petroleum Co. 2 University-Andrews, Ordovician discovery in SW SE Section 30, Block 10. All the tests are to start at once and will be drilled with rotary to 4,650 ft. unless production is developed shallower.

The new wells were: 1-C University, NE SW Section 24, Block 11; 1-D University, NE SW Section 25, Block 11; 1-E University, NE SW Section 36, Block 11.

Lamb Wildcat Dry

Stanolind Oil & Gas Co. 1 W. Hopping, SE SW Section 25, Block T, Thompson Survey, Lamb County wildcat ½ mile southeast of Fieldton, was preparing to abandon at total depth of 9,606 ft. in granite after an electrical survey was run. From an elevation of 3,561 ft. the well topped the Mississippian at 9,040 ft., revealing a steep dip in formations immediately north of the granite ridge that extends across the northern part of the Permian basin. The point was correlated 2,125 ft. lower than in a granite failure in southeastern Hale County to the east. The Ellenburger, lower Ordovician, was reached at 9,455 ft., and granite was topped at 9,600 ft. A core from 9,602-06 ft. recovered 4 ft. of granite.

NORTHERN WEST TEXAS COMPLETIONS

Fields

Sharon, Mitchell County: F. W. Merrick 4-B J. L. Strain, elev. 2,154 ft., pumped 88 bbl. after shot, pay 1,557 ft., T.D. 1,722 ft.

Slaughter, Hockley County: DeKalb Agricultural Association 1 G. W. Alexander, 554 ft. from N and E lines of south 372 acres, Sec. 7, Blk. X, P.S.L. Sur., elev. 3,555 ft., flowed 1,653 bbl. through casing after acid, pay 5,001 ft., T.D. 5,043 ft., *½-mile-west outpost.*

Honolulu 35-B Slaughter, NE NE Lab. 50, Lge. 37, Zavalla C.S.L. Sur., elev. 3,515 ft., flowed 1,213 bbl. through 2½-in. casing outlet after acid, pay 4,900 ft., T.D. 4,975 ft.

Texas 8-C Mallett, SE SE Lab. 13, Lge. 51, Scurry C.S.L. Sur., elev., 3,608 ft., flowed 747 bbl. through casing after acid, pay 5,030 ft., T.D. 5,043 ft., *south edge well.*

West Andrews, Andrews County: Magnolia 1 University, NW NW Sec. 26, Blk. 10, University Sur., elev. 3,219 ft., pumped 44 bbl. oil and 39 bbl. water after shot and acid, pay 4,460 ft., T.D. 4,500 ft.

Skelly 1-J University, SE SE Sec. 22, Blk. 10, University Sur., elev. 3,210 ft., pumped 134 bbl. fluid cut 3 per cent b.s. and 2 per cent water, anhydrite 1,740 ft., Yates sand 2,890 ft., brown lime 3,990 ft., Grayburg lime 4,170 ft., pay 4,420 ft., T.D. 4,510 ft.

Waples-Platter, Yoakum County: Drilling & Exploration 1-A Waples-Platter, NE NW Sec. 616, Blk. D, J. H. Gibson Sur., elev. 3,563 ft., flowed 150 bbl. through ⅞-in. tubing choke, acid, pay 5,215 ft., T.D. 5,295 ft.

Wasson, Yoakum County: Westex Oil 3 Corder, NE NW Sec. 36-B, Blk. AX, P.S.L. Sur., elev. 3,602 ft., flowed 219 bbl. through ⅝-in. tubing choke after acid, pay 4,920 ft., T.D. 5,025 ft.

Large Producers Extend Abell Ordovician Pool Southward

Two more slight southward extensions to the Abell Ordovician pool in Pecos County were made last week. The first was at Stanolind 1 Sidney Silverman, Section 10, Block 3, H.&T.C. Survey, ¼ mile south of production. The well was completed for a daily potential of 1,214 bbl. of oil with gas volume of 772,000 cu. ft. Total depth was 5,390 ft. in lime and shale.

Testing was started after 5½-in. casing was perforated at 5,354-62 ft. During the first hour of the test it flowed 62 bbl. and on the second hour, through a regular ½-in. positive choke, 46 bbl.

The other extensions was assured at Tal-Vez Oil Co. 2 Burnett, Section 5, Block 3, H.&T.C. Survey. At total depth of 5,774 ft. in lime and shale, an electrical log was run and the preparations were made to run a string of 5½-in. casing. On a 30-minute drill-stem test at 5,745-69 ft. the well blew gas in 20 minutes and recovered 460 ft. of oil. The well will be perforated opposite the McKee sand, one of the producing formations in the pool.

Oil Showing in Couch Outpost

Roger Harris and Curtis R. Inman 1 Humble-W. D. Padgett, 660 ft. from the northeast and northwest lines of Section 17, C. S. White Survey, ½ mile southeast of production in the Clara Couch pool of western Crockett County, was making ready for completion at total depth of 2,120 ft. in lime. Casing was set at 2,100 ft. where oil was found. By the time the total depth was reached, 700 ft. of oil stood in the hole.

Deep Test at Keystone Lime

The Ordovician lime is to be explored beneath the Keystone lime pool in Winkler County, currently one of the most active fields in the basin. Location for the test, to go to 10,000 ft., was made by Amon G. Carter of Fort Worth as 2-C J. B. Walton et al, SW NE Section 1, Block B-3, P.S.L. Survey.

The well will be 3½ miles east of Magnolia 20 State-Walton, which was abandoned at 8,445 ft. in Devonian lime and chert.

SOUTHERN WEST TEXAS COMPLETIONS

Wildcats

Reagan County: Argo 1 J. S. Nunn, SE SW Sec. 8, Blk. B, L.&S.F. Sur., 22 mi. N of Big Lake field, elev. 2,676 ft., dry, anhydrite 1,260 ft., Yates sand 2,070 ft., lime 3,298 ft., T.D. 3,585 ft.

Sterling County: Gulf 1-C W. L. Foster, NW NW Sec. 28, Blk. 12, S.P.R.R. Sur., 2½ mi. S and E of Sterling City, dry, Ellenburger 8,055 ft., T.D. 8,117 ft.

Sutton County: S. B. Roberts et al 1 George Allison, NW NE Sec. 44, Blk. K, G.H.&S.A. Sur., elev. 2,364 ft., dry, Palo Pinto 3,725 ft., Strawn 4,663 ft., detrital 5,140 ft., Ellenburger 5,107 ft., T.D. 5,416 ft.

Fields

Barnhart, Reagan County: Amerada 1-RF University, NW SE Sec. 2, Blk. 43, University Sur., elev. 2,725 ft., flowed 509 bbl. through ½-in. tubing choke after acid, base black shale 8,956 ft., pay 9,077 ft., T.D. 9,177 ft.

Emperor, Winkler County: Skelly 49 Halley, elev. 2,772 ft., flowed 1,273 bbl. through ¾-in. tubing choke after shot, anhydrite 950 ft., brown lime 2,460 ft., Yates 2,570 ft., pay 2,730 ft., T.D. 2,893 ft.

Emperor Deep, Winkler County: Stanolind T88HX2 Hendricks, SE NE Sec. 28, Blk. B-5, P.S.L. Sur., elev. 2,815 ft., flowed 206 bbl. through ½-in. tubing choke after shot, pay 2,870 ft., T.D. 2,990 ft.

McElroy, Upton County: Gulf 270 McElroy, elev. 2,614 ft., flowed 3,334 bbl. through casing after shot, pay 2,670 ft., T.D. 2,861 ft.

Taylor Link, Pecos County: William Wolf 1-A University, SE NE Sec. 26, Blk. 16, University Sur., elev. 2,689 ft., pumped 127 bbl. after shot, pay 1,775 ft., T.D. 1,803 ft.

William Wolf 4-A University, elev. 2,717 ft., pumped 10 bbl. oil and 12 bbl. water after shot, pay 1,764 ft., T.D. 1,787 ft., P.B. 1,780 ft.

Waddell, Crane County: Gulf 54 Waddell, NE SW SE Sec. 10, Blk. B-23, P.S.L. Sur., elev. 2,770 ft., flowed 11,142 bbl. through casing and tubing after acid, pay 3,480 ft., T.D. 3,495 ft.

Wentz-Millar, Pecos County: Gulf 3 Millar, SE NW Sec. 43, Blk. 11, H.&G.N. Sur., pumped 132 bbl. after shot, 38.8 gravity, Ellenburger 4,167-4,376 ft., pay 4,381 ft., T.D. 4,406 ft., *opens Cambrian production in field.*

TEXAS PANHANDLE

AMARILLO, Tex.—Phillips Petroleum Co. has started eight new gas wells southwest of Pampa. The tests are spotted over an area 5 miles by 6 miles. Not more than a half dozen gas wells have been completed in that section, ranging in production from 3,000,000 to 100,000,000 cu. ft.

In all, 11 new locations were reported in the Panhandle field this week, eight in Gray County, two in Carson County and one in Hutchinson County, all for gas but two. A total of 155 new locations have been filed so far this year.

TEXAS PANHANDLE COMPLETIONS

Carson County: Skelly 147 Shafer, Sec. 190, Blk. 3, I.&G.N. Sur., potential 350 bbl., shot 3,205-72 ft., T.D. 3,272 ft.

Gray County: Phillips 7 McKinney, Sec. 137, Blk. 3, potential 225 bbl., shot 3,194-3,283 ft., T.D. 3,299 ft., P.B. 3,283 ft.

Texas 7 Taylor-F, Sec. 37, Blk. B-2, potential 323 bbl., shot 2,818-68 ft., T.D. 2,870 ft.

Hutchinson County: J. M. Huber 19 Weatherly, Sec. 26, Blk. Y, potential 221 bbl., no shot, T.D. 2,988 ft.

J. M. Huber 3 Burch-Weatherly, Sec. 24, Blk. Y, potential 279 bbl. after acid, T.D. 3,089 ft., P.B. 3,042 ft.

Texas 41 Pond, Sec. 1, Blk. M-21, potential 188 bbl., shot 2,963-3,060 ft., T.D. 3,060 ft.

Moore County: Shamrock Oil & Gas 2 McDowell, Sec. 12, Blk. 1-PD, gaged 170,000,000 cu. ft. gas, 332 lb. R.P., T.D. 3,250 ft., P.B. 3,246 ft.

Wheeler County: Pendleton & Vaughn 1 McDowell, Sec. 55, Blk. 23, gaged 14,200,000 cu. ft. gas, T.D. 1,698 ft.

SOUTHEAST NEW MEXICO

HOBBS, N. M.—A new pool is in prospect in northern Lea County, 20 miles east of the small Caprock pool and 25 miles north of Lovington. Mascho and American Drilling Corp. 1 Tide Water-State, SW NW 18-12-35, penetrated porous and oil-stained lime at 4,935-5,015 ft. and is shut down awaiting pipe.

Prior to the extension of P-98, 57 new locations

(Continued on Page 65)

INDIANA, OHIO, KENTUCKY

Evansville Test Makes Small Pumper in Waltersburg

EVANSVILLE, Ind.—George E. Nelson et al 1 P. Stader, NE SE NW 32-6s-11w, wildcat 2½ miles southeast of Evansville, is being cleaned out a second time after a pump test in which it made an estimated 24 bbl. of oil a day. No. 1 Stader is producing from the Waltersburg sand at 1,780 ft.

Sun Oil Co. 1 Bennett, SE SE 4-8s-14w, a Posey County wildcat about 5 miles west and 7 miles south of Mount Vernon, is shut down at a total depth of 2,748 ft. in the St. Louis lime, awaiting results of an electric log. A slight show was found in the Palestine sand and there was streaked saturation in the Aux Vases sand but it is doubtful whether either formation is of commercial value.

In Gibson County R. D. Brown 1 J. Lehman, SW SW NE 36-1s-10w, flowed 120 bbl. of oil in 24 hours in its latest production test from the Hardinsburg sand at 1,333-51½ ft. The test, 3½ miles northeast of Princeton, is the best producer in the area. It has flowed 523 bbl. of oil in the past 7 days. (Completions on Page 66.)

OHIO

ZANESVILLE, Ohio.—Scattered gas successes make up the majority of Ohio completions. The Clayton pool in Perry County yielded a 228-bbl. producer.

Wildcat Clinton tests in Morgan and Tuscarawas counties find that horizon dry. The Tuscarawas County test reached a total depth of 5,356 ft.

The Oriskany test on the west side of the Parkersburg syncline, Clyde M. Foraker 1 Claude Murray, Meigsville Township, Morgan County, logged the Berea at 1,440-1,500 ft., small show of gas, oil, and water; now drilling at 1,625 ft.

OHIO COMPLETIONS

Ashland County, Perry Township: Ohio Fuel 1 Blanche Ryland, Sec. 35, 100,000 cu. ft. gas, shot, Clinton, T.D. 2,906 ft.

Athens County, Carthage Township: H. B. Walker 1 Herman Taylor, Sec. 33, 3 bbl., 100,000 cu. ft. gas, shot, Berea, T.D. 1,805 ft.

Rome Township: William Cook 1 T. Copeland, Fraction 6, dry, Maxon (water), T.D. 1,805 ft.

Coshocton County, Tiverton Township: Ohio Fuel 1 O. U. Holt, Sec. 7, 430,000 cu. ft. gas, Clinton 3,255-3,320 ft., T.D. 3,321 ft.

Fairfield County, Berne Township: City Natural Gas Works 1 A. Haines, Sec. 11, 50,000 cu. ft. gas, Clinton, T.D. 2,373 ft.

Holmes County, Knox Township: Ohio Fuel 1 F. D. Kinsey, Sec. 17, dry, Clinton (small show gas), T.D. 3,502 ft.

Richland Township: Ohio Fuel 1 A. Hunter, Sec. 4, 170,000 cu. ft. gas, shot, Clinton, T.D. 3,409 ft.

Knox County, Union Township: Ohio Fuel 1 Mary Hauger, Sec. 17, dry, Clinton 2,855-2,900 ft., T.D. 2,948 ft.

Lorain County, Pittsfield Township: R. C. Cain 1 V. Zalka, Lot 1, dry, no Clinton sand, T.D. 2,256 ft.

Medina County, Hinckley Township: Ohio Fuel 1 Earl Kellogg, Lot 68, 650,000 cu. ft. gas, shot, Clinton, T.D. 3,455 ft.

Meigs County, Salem Township: Ohio Fuel 1 J. T. Sedlie, Sec. 1, 540,000 cu. ft. gas, Salt sand, T.D. 729 ft.

Rutland Township: Downie et al 3 J. W. Miller, Sec. 32, 760,000 cu. ft. gas, Maxon, T.D. 752 ft.

Monroe County, Summit Township: Clem Peters 1 H. Schell, Sec. 26, 1 bbl., shot, lime sand (Keener dry), T.D. 1,476 ft.

Sunsbury Township: William Payne 1 William Ganoe, Sec. 6, dry, Berea (show oil), T.D. 2,194 ft.

Wayne Township: Kovert et al 1 H. Bach, Sec. 21, 30,000 cu. ft. gas, Berea, T.D. 1,890 ft.

Morgan County, Deerfield Township: Industrial Gas Corp. 1 P. Weaver, Sec. 4, dry, Clinton 4,160-95 ft., T.D. 4,275 ft.

York Township: Swingle et al 2 Carl Weaver, Sec. 36, 180,000 cu. ft. gas, Berea, T.D. 1,120 ft.

Muskingum County, Salt Creek Township: Ohio Fuel 1 H. D. Lewis, Sec. 8, 1,150,000 cu. ft. gas, shot, Clinton 4,159-87 ft., T.D. 4,192 ft.

Washington Township: Ohio Fuel 1 Anna Bowers, Lot 22, 100,000 cu. ft. gas, shot, Clinton 3,871-91 ft., T.D. 3,907 ft.

Wayne Township: Ohio Fuel Gas Co. 1 A. Kirkbrige, SW Sec. 8, 559,000 cu. ft. gas, Clinton and Medina sand, T.D. 4,008 ft.

Perry County, Clayton Township: Pure Oil 1 J. W. Ford, Sec. 6, 228 bbl. first 16 hr. after shot, shot, Clinton, T.D. 3,234 ft.

Pure Oil Co. 2 J. A. Pargeon, NW Sec. 7, 10 bbl. and 500,000 cu. ft. gas, Clinton sand, T.D. 3,265 ft.

Ohio Oil Co. 1 Callie Dugan, NE Sec. 32, dry, Clinton sand, T.D. 3,327 ft.

Tuscarawas County, Union Township: James Upham 1 Rudolph Wagner, Sec. 21, Clinton 5,277-5,326 ft., T.D. 5,356 ft.

Vinton County, Elk Township: Kelch Bros. 1 J. C. Sampson, Sec. 19, 10,000 cu. ft. gas, Ohio shale, T.D. 1,065 ft.

Washington County, Aurelius Township: G. F. Warren 9 fee, Sec. 18, 2 bbl., Macksburg 300-ft. sand, T.D. 310 ft.

Liberty Township: Otto Heldman 1 F. Doyle heirs, Sec. 14, 500,000 cu. ft. gas, Maxon 1,380 ft.

Grandview Township: Loman Farm Oil Co. 1 W. H. Loman, NE Sec. 14, 4 bbl., Keener sand, T.D. 1,650 ft.

EASTERN KENTUCKY

ASHLAND, Ky.—Four gas wells were completed in eastern Kentucky this week with most operations continuing on the same steady pace displayed in the last few weeks.

(Continued on Page 64)

and—

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SPANG NAME IN CABLE TOOLS

APPALACHIAN FIELDS

Oriskany Sand Found Dry In Ritchie County Wildcat

PITTSBURGH, Pa.—An important test in Ritchie County, West Virginia is drilling through the Oriskany sand which appears bone dry for 62 ft. and which still further limits Oriskany production. Jackson County added more fair gas wells from the Oriskany sand. Work in Pennsylvania was routine with one deep test being bottomed below 8,000 ft. and dry.

On the Fayette anticline in South Huntington Township, Fayette County, Peoples Natural Gas Co. bottomed the test on the Jacobs Creek Oil Co. at 8,080 ft. with no showing of oil, gas or water. The Onondaga lime was topped at 7,317 ft., chert 7,348 ft., Oriskany 7,902 ft. after an extremely thick section of Onondaga; Helderberg 7,982 ft. A temperature survey showed the bottom-hole temperature of 211°, a steady curve with only one point showing a rise and that in the Onondaga and for 1° only.

SOUTHWEST PENNSYLVANIA COMPLETIONS

Armstrong County, Burrell Township: J. K. Sharp 1 Frank Henry, 212,000 cu. ft. gas, Murraysville 974-1,085 ft., gas 976-94 ft., Hundred-foot 1,105-65 ft., gas 1,152 ft., T.D. 1,303 ft.

Plum Creek Township: Peoples 1 N. and E. Rossborough, 48,000 cu. ft. gas, Speechley 2,748-2,805 ft., gas 2,778-93 ft., Tiona 2,879 ft., gas 2,888 ft., T.D. 3,476 ft.

Valley Township: Equitable 1387 Mary E. and Samual Runyan, drilled deeper, 30,000 cu. ft. gas, started 2,644 ft., Sheffield 3,132-56 ft., T.D. 3,350 ft.

Wayne Township: Humphries, Stone & McCall 2 Jane Kurdes, 20,000 cu. ft. gas, Sheffield 2,600-23 ft., gas 2,615 ft., first Bradford 2,662-2,704 ft., gas 2,694 ft., T.D. 3,249 ft. May not produce.

Fayette County, Nicholson Township: Wahler-Powers 2 Geneva Supply Co., drilled deeper, 600,000 cu. ft. gas, Big Injun 1,224 ft., gas 1,380 ft., T.D. 1,386 ft.

Greene County: Aleppo Township: Cleveland-Cameron Gas Co. 1 John Anderson, drilled deeper, 50,000 cu. ft. gas, Gordon sand 2,930-60 ft., gas 2,938 ft., T.D. 3,352 ft.

WEST VIRGINIA

In Ritchie County, the deep test of Benedum & Trees on the L. J. Rinehart farm in Grant district topped the Oriskany sand at 5,834 ft., steel line measurement, and 61 ft. in that member which is still continuing as sand, is void of production and with no water showing. The surface elevation is 810 ft.; Big lime 1,597-1,645 ft., Injun 1,645-1,770 ft., Corniferous lime 5,637 ft. It is possible that it may be deepened to the Newburg horizon. This tests the west flank of the Wick anticline and is located 1.3 miles west 81° 10', 4.5 miles south 39° 20'.

WEST VIRGINIA COMPLETIONS

Braxton County, Salt Lick district: Pittsburgh & West Virginia 7880 Bessie E. Mick, 109,000 cu. ft. gas, Injun sand, T.D. 2,196 ft.

Calhoun County, Sherman district: Virginian Gasoline & Oil Corp. 1321 Arminda Elliott, 5 bbl., Injun sand, T.D. 2,135 ft.

Washington district: Hope 8620 C. C. Knotts, 440,000 cu. ft. gas before shot, Salt sand 1,593-1,606 ft., gas 1,601-06 ft., R.P. 420 lb., T.D. 1,617 ft.

Clay County, Henry district: Thompson Gas Co. T55 Samuel King, 408,000 cu. ft. gas, Big lime 1,911-2,033 ft., Injun 2,033-60 ft., T.D. 2,076 ft.

Gilmer County, Troy district: Osborn Gas Co. 1 Eva Osborn, dry, Maxton sand, T.D. 1,490 ft.

Lincoln County, Duval district: South Penn 4 Stephenson heirs, 531,000 cu. ft. gas, Big lime gas at 1,903 ft., T.D. 1,923 ft.

Putnam County, Curry district: Charles Gas Co. 3 Oscar Johnson, 127,000 cu. ft. gas, Berea 2,301-21 ft., shot 2,301-25 ft., T.D. 2,343 ft.

Ritchie County, Grant district: South Penn 2 Foy heirs, 2,000,000 cu. ft. gas, Injun sand, T.D. 1,985 ft.

Murphy district: Spruce Oil & Gas

(Continued on Page 75)

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CANADIAN FIELDS

Ram River Wildcat Still Awaiting Test

By VICTOR LAURISTON

CHATHAM, Ont. — On the Ram River-Clearwater structure, Ram River Oils 2, LSD 8, 1-37-11w5, in Devonian limestone at 4,340 ft., is still awaiting production test. Bad weather and road conditions have prevented the moving in of equipment. Oil has risen 300 ft. or more above the fluid level and pressure is fairly steady at 165 lb. with some gas. The crew has attempted bailing down with drill rods, increasing the gas flow somewhat but failing to bring in a flowing well.

Taber field.—In the Taber field, southern Alberta, Standard of British Columbia 1 Provinces, LSD 9, 18-9-16w4, bottoming in the lime at 3,274 ft., has made successful shutoff of the lower water and is testing 12 ft. of Sunburst sand below 3,160 ft. which showed considerable crude.

Erickson Coulee prospect.—On the Erickson Coulee structure, just north of the Montana boundary, Russell V. Johnson of Calgary has spotted location in LSD 1, 5-1-12w4, for a joint test by National Petroleums and Vulcan Oils. Test will be known as National Vulcan Border 1, and rig will be moved in as soon as road conditions permit. Location is in the St. Kilda district, east of Coutts and northeast of the Kevin-Sunburst field. Tentative location has been made for No. 2. No. 1 will be carried to the lime, around 2,300 ft., using heavy-duty rotary, and No. 2 will be drilled 2,600 ft. for a thorough test of the lime. The company's 7,000 acres on the Montana side will probably be developed by a subsidiary company. The Alberta area was tested in 1927 by Northwest Co. 1, 8-1-12w4, which got a strong gas flow at 2,531 ft.

Pouce Coupe Test Runs High

On the Pouce Coupe structure in the northern Alberta foothills, Bonanza Royalties 1, LSD 16, 22-80-13w6, is logging 42 ft. higher structurally than the Northwest Co. gasser and 122 ft. higher than Guardian Oil 1. Test is below 1,855 ft., with the chief gas horizon encountered in the Northwest well expected around 2,130 ft.

Wainwright. — In the Wainwright field, east-central Alberta, Wainwright Development 1, LSD 8, 17-45-6w4, finished at 2,287 ft. and plugged back to 2,200 ft., had an initial pumping production of 8 bbl. daily from the upper sand. Pumping equipment will be adjusted in an effort to improve production.

Keho Lake. — In the Keho Lake area, southern Alberta, Keho Dome Oils 1, LSD 3, 18-11-22w4, is preparing to resume from 2,500 ft. Test is 1¼ miles west of Hudson's Bay 1, which some years ago got a small commercial crude production in the Benton as well as good showings in the top of the underlying Madison limestone.

On the Twin River structure, Pan American 1, LSD 14, 34-1-20w4, is starting derrick, and will spud before the end of July.

Vermilion.—In the Vermilion field, eastern Alberta, Northwest-Claysmore 1, LSD 4, 34-50-8w4, bottoming at 1,764 ft., has set production string at 1,750 ft. and is testing an oil

(Continued on Page 69)

MICHIGAN OPERATIONS

Low Prices Paid for Leases On State Lands

By OTTO C. PRESSPRICH

SAGINAW, Mich.—State-owned land under lease of oil and gas development in Michigan now stands at a record high of 420,000 acres, the lands division of the state Conservation Department reported July 6, after its latest auction disposed of more than 39,000 acres in six counties. Lands leased in Newaygo, Missaukee, Lake, Ogemaw, Wexford and Gladwin counties, brought bonuses of $8,803, an average of 22½ cents an acre, lowest in more than a year. All the lands auctioned were classed as wildcat and includeed 19,000 acres in Newaygo County. Highest prices were paid for acreage in Bedar Creek Township, Wexford County.

Field operations were marked by development of the biggest well yet drilled in Arenac County. The well made 268 bbl. the first hour, for a potential of 6,432 bbl. daily. Drilled by Charles W. Teater of Saginaw, it is 2 Collins, SE SE SE Section 15, Adams Township. Production is from the top of the Dundee, the total depth being 2,865 ft. The development brought the possibility of a new production area off the north side of the old Adams pool. Teater's well is the middle test of three adjoining 10-acre tracts. Two outside wells, each less than a city block from it, were dry.

Projected new operations spurted last week as the state approved 26 permits for a near record week in 1942 which brought the year's total to 282. Of the week's 13 oil and gas completions, one is a wildcat and the best of six new oil wells was one rated at better than 4,000 bbl. a day by Ohio Oil Co. in Richmond Township of Osceola County in the Reed City field. The wildcat is Leonard 1 Nykamp-Shultz in Section 30, Zeeland Township, Ottawa County. Several miles from other production, the test was acidized at 1,665 ft. and was producing at 40 bbl. a day. Louis Rose 1 Twin Lakes in Section 16 of Lake's Sauble Township, an offset to the Shoemaker discovery, was producing 60 bbl. a day, plus salt water, after acid treatment. The discovery was developed in the spring. Two other offset tests were dry.

Taggart Brothers Co. brought in three small gas wells and four other tests were dry, including one in Chippewa Township, Isabella County, two in Allegan County and a wildcat venture in Spencer Township, Kent County.

MICHIGAN COMPLETIONS

Allegany County, Hopkins Township: W. Spencer Cook 1 Wamhoff, NW NE NW 18-3n-12w, dry, T.D. 1,604 ft.

Wayland Township: J. J. McGerry, trustee, and Voorhees Drilling Co. 1 Haywood, SE NW SW 5-3n-11w, wildcat, dry; T.D. 1,760 ft.

Clare County, Freeman Township: Taggart Bros. Co. 1 Holbrook et al, C NW 9-18n-6w, 3,230,000 cu. ft. gas, T.D. 1,479 ft.

Winterfield Township: Taggart Bros. Co. 110 Wheeler-Randall-Gable communitized, C SW 17-20n-6w, 196,000 cu. ft. natural gas, T.D. 1,375 ft., P.B. to 1,360 ft.

Taggart Bros. Co. 116 Deininger-Apgar, C SW Sec. 27, 1,010,000 cu. ft. gas, T.D. 1,323 ft.

Isabella County, Chippewa Township: Daily Crude Oil Co. 1 Davis, NE SE NE 4-14n-3w, dry, T.D. 3,686 ft.

Kent County, Spencer Township: W. Spencer Cook 1 Tertellet, SE SW NE 6-10n-9w, wildcat, dry, T.D. 2,625 ft.

Lake County, Sauble Township: Louis Rose 1 Twin Lakes, NE SW NE 16-19n-14w, 60 bbl. and salt water, acidized, T.D. 2,156 ft.

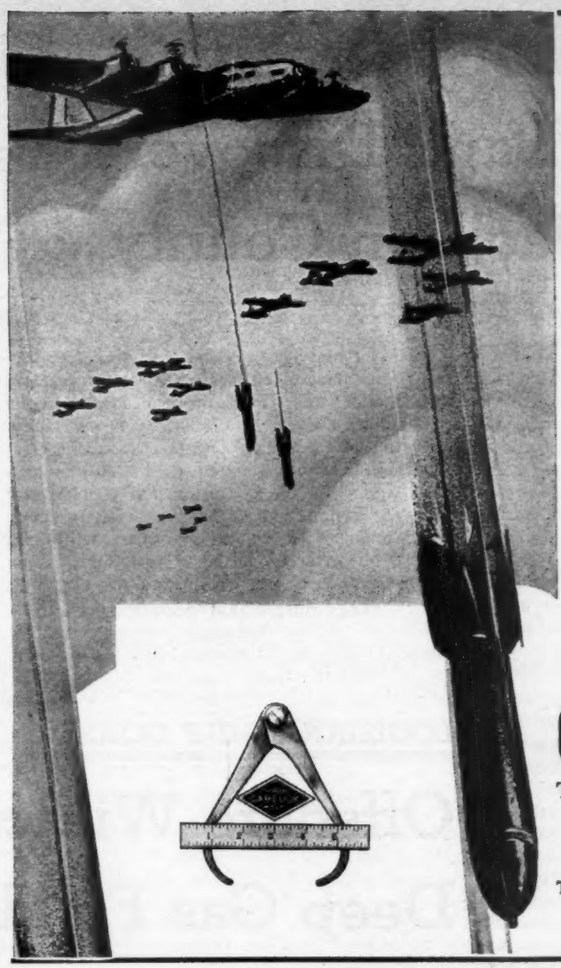
Osceola County, Osceola Township: Sun Oil Co. A-1 Wirth, N½ SE SE 22-18n-8w, 575 bbl. first 17 hr., acidized, T.D. 3,825 ft.

Richmond Township: Ohio Oil Co. 1 Patterson et al, N½ NW SE 5-17n-10w, 4,008 bbl., natural, T.D. 3,579 ft.

Ottawa County, Zeeland Township: D. M. Leonard, trustee 1 Nykamp-Shultz comm., SE SW SE 30-5n-14w, pumping 40 bbl., acidized, T.D. 1,665 ft., wildcat.

Roscommon County, Richfield Township: Ohio Oil Co. 1 Van Wagoner, N½ NW SE 29-24n-1w, 45 bbl., acidized, T.D. 4,196 ft.

Van Buren County, Bloomingdale Township: Jetter & de Krafft 1 Munn, SW NE SW 12-1s-14w, pumping 144 bbl. and salt water, T.D. 1,288 ft.



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TEXAS GULF COAST

Fourth Frio Sand Discovery Of Year in Jackson County

By F. L. SINGLETON

HOUSTON, Tex.—Another new Frio sand discovery was apparently opened in Jackson County with the recovery of pipe-line oil in W. S. Boyle et al 1 Rose & Sample, located 4 miles southeast of the town of Ganado in the G. Sutherland Survey. Sand showing oil was cored at 4,988-94 ft., and on a 23-minute drill-stem test at 4,986-94 ft., working pressure built up to 150 lb., and 1,450 ft. of pipe-line oil was recovered. At the close of the week, the operators were preparing to core ahead from a total depth of 5,152 ft. This is the fourth field to be opened in the county since the first of the year. The well is southeast of the West Ganado field and west of the Ganado field, and on strike with the recently opened Harmon field.

To the southeast and located in the new West Mauritz field, J. B. Coffee 1 T. N. Mauritz, about 4,500 ft. northwest of the discovery well, was reported to be flowing oil and wash water while cleaning out through a 9/64-in. choke. Total depth is 5,490 ft., and the well is testing through perforated casing at 5,484-88 ft. As production of these new discoveries continue to be expanded there is a possibility that production may be joined, and for this reason much interest will follow the progress of Gulfboard 1 D. E. Burdett located in the M. L. York Survey. The location is in approximately the center of four fields. The location is about 2,900 ft. northeast of the Harmon field, 4,000 ft. southwest of the Ganado field. and about 7,000 ft. northwest of the Mauritz field.

In the meantime, Humble Oil & Refining Co. spudded in on a new wildcat operation, southwest of town of Edna in the C. Lasso Survey. The location is on the San Antonio Joint Land Bank lease. Other active wildcat operations include J. G. Mayo, Rowan & Hope 1 Kasper, a Frio sand test northwest of the town of La Salle in the V. Garcia Survey, and G. Warren et al 1 Zajicek, 5 miles southwest of Ganado in the G. Sutherland Survey.

Ohio 1 McDonald, a prospective Frio sand discovery, midway between the North Markham and Van Vleck fields, Matagorda County, was being retested after it flowed gas through perforated casing at 8,399-8,405 ft. This well has logged favorable showings at 8,031-81 ft. and 8,345-54 ft., and these sands will no doubt be tested although final completion is expected to be made at 7,865-84 ft., where a recent drill-stem test recovered several hundred feet of pipe-line oil.

To Test Wilcox in Glendale Wildcat

Operators interested in development along the updip sector of the Wilcox trend centered their attention on the Glendale area, Trinity County, where Magnolia Petroleum Co. was preparing to test 2 William Cameron, a wildcat located in the H. Band Survey. With the hole bottomed at 7,310 ft., 5½-in. casing was cemented at 5,835 ft., after side-wall cores recovered sand with an oil odor at 5,658 ft., 5,721 ft., 5,736 ft., 5,738 ft., and 5,744 ft. This is the second well to be drilled in the area by the company, and additional development was anticipated following the abandonment of 1 Cameron earlier in the year. This well logged sufficient showing in the upper Wilcox to warrant cementing of casing although no commercial production was developed.

Trinity County gained a new wildcat operation as W. A. Wise staked location for 1 Texas Long Leaf Lumber Co., 8 miles north of Trinity in the F. Martinez Survey. Nine miles north of Trinity. Pan American 1 Texas Long Leaf Lumber Co., J. Ceballes Survey, was bottomed at 5,100 ft. where drill stem was stuck. During the past several months, leasing and geophysical activity along this particular sector has been most active and several blocks are reported to have been assembled.

TEXAS GULF COAST COMPLETIONS

Wildcats

Liberty County: W. F. Bowman 1 Louis Lobit, dry, T.D. 8,004 ft.

Fields

Goodrich, Polk County: Pan American 1 Texas Long Leaf Lumber Co., dry, T.D. 4,136 ft.

Harmon, Jackson County: Gulfboard 1 McCrory, 112 bbl., ⅛-in. choke, perf. casing 5,386-94 ft., T.D. 8,395 ft.

Maubro, Jackson County Humble 9-B Mauritz, 162 bbl., ¼-in. choke, sand 5,222-35 ft.

Mayo, Jackson County: L. Crouch 1 Angle, 74 bbl., 7/64-in. choke, perf. casing 5,427-32 ft., T.D. 5,622 ft.

Oyster Bayou, Chambers County: Sun 1 Jackson, 398 bbl., ⅞-in. choke, perf. casing 8,301-36 ft., T.D. 8,375 ft.

Texana, Jackson County: Gulf 2 Simmons, 70 bbl., ¼-in. choke, perf. casing 5,705-10 ft., T.D. 7,897 ft.

Withers, Wharton County: Texas 1 Duffy, dry-gas well, no gage, perf. casing 5,652-64 ft., T.D. 6,647 ft.

Texas 11-C Pierce, 121 bbl., ⅛-in. choke, perf. casing 5,350-65 ft., T.D. 5,385 ft.

Eastern Kentucky

(Continued from Page 61)

Knott County: Inland Gas Corp. 231 Dora Perkins et al, Nealy Fork of Troublesome Creek, 158,000 cu. ft. gas in white slate at 3,282 ft.

Kentucky-West Virginia Gas Co. 5398 Richard Hall, Right Beaver Creek, T.D. 3,255 ft., white slate, 808,000 cu. ft. of gas, shot.

Kentucky-West Virginia Gas Co. 5408 Taylor & Reed, Jones Fork, T.D. 1,440 ft., Salt sand, 300,000 cu. ft. gas.

Floyd County: Kentucky-West Virginia Gas Co. 5394 John Calhoun, dry at 2,940 ft. in shale.

Kentucky-West Virginia Gas Co. 5377 Thomas J. McGowan ,on Frazier Creek, T.D. 3,388 ft., 442,000 cu. ft. gas, shot.

LOUISIANA GULF COAST

Offshore Wildcat Opens New Deep Gas Field

By F. L. SINGLETON

NEW ORLEANS, La.—A new gas field was opened in the Louisiana Gulf Coast district with the completion of Texas 1 State-Rabbit Island, offshore from Iberia Parish in the Gulf of Mexico. Production was obtained by perforating casing at 8,670-8,700 ft., and the well flowed at the estimated rate of 5,000,000 cu. ft. of gas daily through various chokes. The well is the third to be drilled in the area and additional development is expected.

In the Castell area, Terrebonne Parish, Humble 1 Continental Land & Fur Co., is bottomed at 11,087 ft., and preparations are being made to drill ahead after cementing a protection string of 7-in. casing at 9,739 ft. This well is credited with having logged showings of oil and gas below 9,000 ft. In the meantime, the company has enlarged its exploration program with the spudding of three wildcats. They are 1-B Continental Land & Fur Co., in the Turtle Bayou area, Terrebonne Parish, 1 Land & Fur Co. in the Pecan Island area, Vermilion Parish, and 1 Leon P. Gautreau in the Duplessis area, Ascension Parish.

In the Jug Lake area, Terrebonne Parish, Superior 1 LaTerre, Inc., 27-19s-15e, encountered a strong salt-water flow at 13,397 ft., and mud is being conditioned before drilling ahead. This well has also logged showings of gas and distillate and casing was set recently as a precaution against any attempted blowout.

Sparta Yields Oil and Salt Water in Pine Prairie Test

Texas 1 LeDanois Land & Stone Co., located on the southwest flank of the Pine Prairie dome, Evangeline Parish, is reported to have recovered oil and salt water on a drill-stem test in the Sparta formation at approximately 9,462-93 ft., and the well was being retested at close of the week. Slight showings were reported to have been logged in the Wilcox at 10,385-10,405 ft., but the section was not tested.

In the West Gueydan field, Vermilion Parish, Pure Oil Co. is rigging up for 1 Calcasieu National Bank in 41-12s-2w, an offset to the company's 1 Vermilion Irrigation Co., recently completed in a new deep sand. In addition to this operation, Magnolia Petroleum Co. is drilling ahead in 5 J. B. Ferguson, which is also projected to the 10,700-ft. sand.

Union Sulphur 3 T. R. S. Farms, a deep test located in the South Roanoke field, Jefferson Davis Parish, has been plugged back from a total depth of 11,015 ft., and a production test was scheduled to be made from sand at 10,295-10,315 ft.

LOUISIANA GULF COAST COMPLETIONS

Wildcats

St. Mary Parish: Danciger 1 Adeline Sugar Factory, dry, T.D. 7,505 ft.

Fields

Bayou DeChene, Jefferson Parish: Texas 2-A La Fourche Basin Levee Dist., dry, T.D. 11,436 ft.

Bayou Des Allemands, St. Charles Parish: 6 State, 227 bbl., ⅛-in. choke, perf. casing 9,950-80 ft., T.D. 10,460 ft.

Belle Isle, St. Mary Parish: Sun 1 Belle Isle Corp., dry, T.D. 12,012 ft.

Chalkley, Cameron Parish: Shell 15 Hanszen, 295 bbl., 7/64-in. choke, perf. casing 10,057-75 ft., T.D. 10,981 ft.

Delta Farms, La Fourche Parish: California 6 Delta Farms, 277 bbl., 9/64-in. choke, perf. casing 9,023-56 ft., T.D. 9,060 ft.

Garden Island, Plaquemines Parish: Texas 56 State, 162 bbl., ⅛-in. choke, perf. casing 6,300-30 ft., T.D. 7,255 ft.

Golden Meadow, La Fourche Parish: Texas 17 LaTerre Co., dry, T.D. 10,531 ft.

Pine Prairie, Evangeline Parish: Pan American 2 Monsour, 200 bbl., ⅛-in. choke, perf. casing 7,946-96 ft., T.D. 2,037 ft.

Port Barre, St. Landry Parish: Grubb & Hawkins, 130 bbl., 8/64-in. choke, perf. casing 6,022-50 ft. and 6,285-6,308 ft., T.D. 6,309 ft.

Valentine, La Fourche Parish: Shell 2 Edna Plantation, dry, T.D. 10,000 ft.

West Bay, Plaquemines Parish: Gulf 4 State, 24 bbl., 5/32-in. choke, perf. casing 6,740-50 ft., T.D. 7,440 ft.

Peace Creek Area Extended To North and West

By CARL HOOT

DRILLING and extension wells continue at a good pace in the Peace Creek pool of Reno County. In the Schweizer area Mid-Continent 1 Smisor, SW SE SW 30-22-9w, was completed for 28 bbl. an hour from the Viola at 3,691-3,706 ft. It is a ½-mile north extension to the field. Leader Oil 2 McMurray, SW SW SE 10-23-10w, and approximately in the center of the 7-mile long field, extended the western boundary ½ mile when it flowed 75 bbl. an hour after being drilled 1 ft. in the Viola at 3,706 ft.

Additional Arbuckle Production In Ray Pool

In northwestern Kansas the Ray pool of Phillips County had three oil completions. Although the main pay of the field comes from La Motte sand, there is scattered Arbuckle production in the northern part of the field. Cities Service 1-D Reese, SW SW NE 29-5-20w, was reported to have made 1,314 bbl. state potential from both the Arbuckle at 3,633 ft. and LaMotte sand at 3,650 ft. It is a ½-mile north extension.

In southwestern Barton County Lario Oil & Gas 1 Muller, N½ SE NE 35-20-11w, extended Arbuckle production ¾ mile south of the Silica pool and made state potential of 403 bbl. of oil from Arbuckle dolomite topped at 3,045 ft. Although production in the Silica pool is also from the Arbuckle, the well is rated as a discovery by the Kansas Corporation Commission and the new pool has been given the name Muller. The same company's 1 Tammen, N½ SW NW 36-20-11w, an east offset, was reported drilling ahead after setting surface casing.

KANSAS COMPLETIONS

Wildcats

Douglas County: Union Gas 1 Williams, NW NW 31-12-19, dry, T.D. 1,680 ft., Mississippi lime 1,523-50 ft.

Jefferson County: McLaughlin et al 1 Gillen, NW SW 2-8-18, dry, T.D. 1,770 ft., sand 1,579 ft., Mississippi lime 1,724 ft.

McLaughlin 1 Piazzek, SE SW 5-8-18, dry, T.D. 1,696 ft., sand 1,418-48 ft.

Leavenworth County: Frank Whitten 1 Courtney, SW NE 15-9-20, dry, T.D. 1,375 ft., sand 1,348 ft.

Marion County: Simmerer & James 1 Melcher, SE SE NE 20-18-4, dry, T.D. 2,456 ft., Mississippi lime 2,388 ft.

McPherson County: Three Way Drlg. 1 Siabach, NW NW SW 2-20-5w, dry, T.D. 3,481 ft., anhydrite 775 ft., Topeka 2,257 ft., Lansing 2,838 ft., Mississippi lime 3,435 ft.

Osage County: Gulf 1 Peterson, SW SE SW 20-15-16, dry, T.D. 2,217 ft.

Rooks County: Cities Service 1 August, SW SE NW 36-10-17w, dry, T.D. 3,701 ft., Lansing 3,309 ft., Arbuckle 3,668 ft.

Stafford County: Stanolind 1 Gillmore, NW SW NW 29-23-14w, dry, T.D. 4,184 ft., Lansing 3,595 ft., Viola 3,992 ft., Simpson 4,011 ft., Arbuckle 4,065 ft.

Fields

Ainsworth, West, Barton County: Simpson Oil 1 Wondra, NW SE NE 5-17-13w, dry, T.D. 3,376 ft.

Buhler, Reno County: Westgate-Greenland 1-C Johns, SE NW SW 25-22-5w, dry, T.D. 3,931 ft.

Chase, Rice County: Hall & Branine 1-A Christopher, SW NE NW 6-20-9w, dry, T.D. 3,306 ft.

Dayton, Phillips County: Schermerhorn 1 Grote, NE NW 1-3-19w, dry, T.D. 3,475 ft.

Edwards, Ellsworth County: Continental Oil 1-B Kunkle, SE SE SW 28-17-8w, pumped 204 bbl. in 12 hr., Arbuckle 3,238-39 ft.

Hall-Gurney, Russell County: Gulf 1 Heard, NW SW SW 30-14-12w, pumped 73 bbl. in 7 hr., Arbuckle 3,137-41 ft.

Kraft-Prusa, Barton County: Gulf 2 Peterman, NE NW SE 15-17-11w, swabbed 57 bbl. in 3 hr., Arbuckle 3,277-3,306 ft.

Shell 2-A Soeken, NE SE SW 15-17-11w, swabbed 253 bbl. in 5 hr., Arbuckle 3,288-3,301 ft.

Vickers Pet. 1-A Soeken, NE NE SE 21-17-11w, swabbed 20 bbl. an hr., Arbuckle 3,274-94 ft.

McLouth, Jefferson County: Hatcher-Fisk 2 Edmonds, SW NW 21-9-20, 2,000,000 cu. ft., sand 1,435-39 ft., T.D. 1,451 ft.

Peace Creek, Reno County: Mid-Continent 1 Smisor, SW SE SW 30-22-9w, swabbed 28 bbl. an hr., Viola 3,691-3,706 ft.

Tide Water 1 Withroder, SW NW NW 1-23-10w, flowed 97 bbl. in 1 hr., Viola 3,691-3,706 ft.

Leader Oil 2 McMurray, SW SW SE 10-23-10w, flowed 75 bbl. an hr., Viola 3,784-85 ft.

Ray, Phillips County: Cities Service 3 Vehige, SW NW SW 28-5-20w, 1,819 bbl., LaMotte sand 3,602-06 ft., T.D. 3,664 ft.

Cities Service 1-D Reese, SW SW NE 29-5-20w, 1,314 bbl., Arbuckle 3,633 ft., LaMotte 3,650 ft., T.D. 3,727 ft.

Cities Service 4-B Hansen, SW SE NW 33-5-20w, pumped 218 bbl. in 11 hr., Lamotte 3,558-66 ft.

Silica, Barton County: C. E. Ash 4-B Schartz, E½ NE SW 7-20-11w, 3,000 bbl., Arbuckle 3,313-21 ft.

Sugarloaf, Ellis County: Darby Pet. 2 Younger, SE SE NW 20-13-17w, dry, T.D. 3,621 ft.

Trapp, Barton County: Transwestern Oil 1 Michaelis, SE NW NW 4-16-13w, 2,560 bbl., Arbuckle 3,364-72 ft.

Forest City Basin

ST. JOSEPH, Mo.—Skelly Oil Co. was drilling below 1,800 ft. at the close of the week at 1 Mutual Benefit, E½ SE SE 32-60n-37w, 4 miles east of Oregon. Mississippi lime had been reached but the top was not immediately announced. This is the only wildcat well in operation north of St. Joseph, Mo.

Speaking for the Tiger Oil & Pipe Line Co. of which he is a member, Charles Sterling of St. Joseph announced this week that the company would build a 12-in. line 38 miles long from the Polo gas field of Caldwell County, Missouri, to the Cities Service Co. line at Independence, Mo., crossing the Missouri River at Liberty. The pool was opened in 1940 on leases held by Skelly Oil Co. There are 16 wells with an approximate daily open flow of 35,000,000 cu. ft. The company will deliver 7,000,000 cu. ft. daily into the line, Mr. Sterling said. Holding some 3,800 acres of leases of its own, the company further proposes to drill for gas itself, he said. Work was scheduled to start within 10 days of the announcement.

Cities Service Co. was preparing to start drilling at 1 Morehead estate, SW NE 16-3n-16e, in the Shubert area of Richardson County, Nebraska.

Skelly Oil Co. was continuing a Viola lime test at 1 Smith, E½ SE SE 3-1n-14e, in the Dawson pool of Richardson County, Nebraska. The lime, topped at 2,886 ft., was acidized after plug was drilled, but results appeared to be unfavorable.

California Fields

(Continued from Page 57)

curacy of the geophysical survey as drilling has tended to show an accumulation against a fault.

In the West Coyote field of Orange County in Los Angeles Basin, Standard Oil Co. has suspended drilling operations in 129 Murphy-Coyote at 9,295 ft. and is plugging back to complete in a productive zone around 6,000 ft. No information is available as to what Standard found in this, the deepest well drilled in the West Coyote field up to the present time, nor is it known whether the bit actually penetrated the upper Miocene. All production to date in this field has come from the Pliocene and 129 Murphy-Coyote was drilled ostensibly to determine if the Miocene would be found productive. In the absence of any actual data, it is assumed that the Miocene was penetrated for about 250 ft. and drilling suspended without finding any additional production. West of the West Coyote field in the La Mirada district, Texas Co. is making a series of formation tests in 2-A McNally in 15-3s-11w, at 9,418 ft. The formation at this depth is a sand that carries a petroleum odor but which does not seem to have any kick. At this depth one would expect the formation to be of Miocene age but in view of formations at Buena Park to the southeast it is believed that 2-A McAnally is still in Pliocene. This is especially true because the company anticipated deep drilling when work was started.

LOS ANGELES BASIN COMPLETIONS

Dominguez, Los Angeles County: Union Oil Co. 13 Austin, 29-3s-13w, pumped 55 bbl., 31.7-gravity, 70 per cent cut, T.D. 7,173 ft., perf. 7,107-70 ft., in seventh Callender zone (Miocene).

Huntington Beach, Orange County: J. H. Marion 1 fee, 36-5s-11w, pumped 75 bbl., 20.7-gravity, 20 per cent cut, T.D. 4,231 ft., perf. 4,111-52 ft., in Ashton zone (Pliocene).

Southwest Exploration Co. 52 State, 4-6s-11w, pumped 422 bbl., 23.7-gravity, 0.1 per cent cut, T.D. 5,221 ft., perf. 4,489-5,221 ft., in Huntington Beach tideland accumulation of Miocene age by directional drilling.

Ojai District Wildcat Is Cleaning Out

Richfield Oil Corp. is still working with 44 Ojai in the Ojai district of Ventura County and is at present cleaning out the hole which sanded up after the well had been on a pumping test for several days. This well, a deep test carried to 8,755 ft. but plugged back to 5,111 ft., was pumping 99 bbl. of 18.1-gravity oil when it sanded up. The cut was still high, however, and there is still some question as to whether the well will prove commercially productive. On the Ramona anticline in Ventura County, Continental Oil Co. was still coring ahead at the close of the week but apparently has not yet found enough porosity to make a well despite the fact that over 300 ft. of oil sand has been cored. The formation is too tight to produce but the company hopes that with depth the formation may loosen up enough to permit oil and gas to be produced. Continental's Ramona well is 1 Holser in 14-4n-18w, and present depth is 4,780 ft. This tight oil sand is an outstanding characteristic of Ventura County and it will be remembered that Chansior-Canfield Midway Oil Co. had over 1,000 ft. of tight oil sand and could not increase pumping production much over 100 bbl. per day.

COASTAL DISTRICT COMPLETIONS

Aliso Canyon, Los Angeles County: Tide Water Associated Oil Co. 1 Sesnon, 28-3n-16w, flowed 3,000,000 cu. ft. gas, pressures 1,700/1,800 lb., T.D. 8,912 ft., perf. 8,658-8,907 ft., in second Modelo zone (Miocene).

Santa Maria Valley, Santa Barbara County: Signal Oil & Gas Co. 8 Yelkin, 26-10n-34w, flowed with pump in hole 450 bbl., 14.6-gravity, 2 per cent cut, T.D. 5,012 ft., perf. 4,523-5,003 ft., in Monterey (Miocene).

Permian Basin, Panhandle

(Continued from Page 60)

were made in Eddy County and seven in Lea. Of these, 34 were in the Square Lake pool north of Grayburg-Jackson. Attempts to extend the new Vandagriff producing area to the southwest met with failure when Culberson & Irwin and Universal Consolidated 1 Hale, SW SE 11-19-30, logged sulfur water at 2,270 ft. and was abandoned.

SOUTHEAST NEW MEXICO COMPLETIONS

Wildcat, Eddy County: Culbertson & Irwin 1 Hale, SW SE 11-19-30, dry, T.D. 2,270 ft. in shale.

Loco Hills, Eddy County: Dixon & Yates 6-A Saunders, 12-18-29, flowed 40 bbl. in 3 hr., pay 2,662 ft., T.D. 2,689 ft.

Lynch, Lea County: Culbertson & Irwin 2 Lynch, NW SW 21-19-32, pumped 3 bbl. fluid an hr., 50 per cent water, T.D. 2,820 ft.

Salt Lake, Lea County: Continental Oil 3 Brooks-7, SW SE 7-20-33, abandoned location.

Square Lake, Eddy County: Sanders Bros. 7 Leonard, 34-16-30, flowed 100 bbl., top pay 2,886 ft., T.D. 2,970 ft., shot.

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ROCKY MOUNTAIN AREA

Unusual Gas Occurrence Found In Rattlesnake Dome Test

By T. R. INGRAM

DENVER, Colo. — The Continental Oil Co. 1 Navajo Indian lease on the Rattlesnake dome, San Juan County, Northwest New Mexico, 2 miles south of the deep tests to the Pennsylvanian it drilled several years ago, ran into a freak development at 6,950 ft. At that depth it encountered a big flow of gas and although heavy mud was being carried, circulation was lost. After heavier mud was mixed, circulation was restored and elaborate preparations were made to prevent a blowout. The well appears to be a freak of unusual proportions. Samples of the gas were immediately sent to the Government for analysis, and in the interest of national defense, the company and the federal authorities are withholding information as to its nature. It may be stated, however, that preliminary investigations show certain chemical contents which are urgently needed in the production of explosives and which are unusual in such large quantities in the history of oil-field development. The future status of the well will depend upon the investigations being made.

The Rattlesnake field produces very high gravity crude in the Dakota sands at shallow depths. Several years ago the company drilled three wells to the deeper Pennsylvanian. In each well freakish conditions were found and although two of them produced considerable quantities of oil, they failed to open a new pool of major proportions. Following the drilling up of the shallow sands, extensive geological and geophysical work was done trying to locate the high from which the deep wells produced. As a result the company acquired a block of 3,720 acres of Navajo Indian land adjoining the old field on the south, southeast, and southwest and 2 months ago it started the test in the new area. The surveys confirmed the lenticular conditions of the lime and each well drilled was considered a wildcat. The formation encountered at 6,950 ft. is not identified, but all indications indicate that the horizons which produced farther to the north are not present.

Deep Test Planned for Elk Basin

An exploratory well which will be of unusual interest in the Rocky Mountain area is to be drilled in the southern part of the Elk Basin field, Park County, Wyoming, by the Minnelusa Oil Corp., in cooperation with the Yale Oil Corp. in its 1 E-T Henderson, NE NE NE 31-58n-99w. Its primary objectives will be the Embar and Tensleep horizons and possibly the Devonian at a depth of around 5,000 ft. The field is one of the oldest in Wyoming, having been discovered in 1915, since which time it has produced in excess of 11,000,000 bbl., mostly 43-gravity crude, from the first and second Wall Creek sands in the Frontier formation at around 1,500 ft. In 1922 a test to the Dakota resulted in a gas discovery and seven wells drilled to that horizon were large producers, one making as high as 90,000,000 cu. ft. No wells have been drilled to the Sun dance, Embar, or Tensleep, but these horizons almost invariably have produced in fields which were proven in the upper horizons. R. S. Shannon, president of Minnelusa, expressed the belief that the Devonian definitely has possibilities in the area, but doubts that this test will find it necessary to go to that horizon. Elk Basin is a highly faulted anticlinal structure with 800 ft. of mapped closure defining 2,560 acres, but authorities agree that the total closure must be two or three times larger with a drainage area of 100 sq. miles. The field reached its peak production from the Wall Creek sands in 1917 when it made 1,530,544 bbl. In 1941 it had declined to 219,795 bbl. The location for the deep test is in the proven area in the Wall Creek.

R. C. Tarrant 1 Wood, C NE NW 32-28n-1w. Midway district, Pondera County, Montana, a test headed for the Devonian, had the top of the Madison at 1,950 ft., and had a show of oil and 400 ft. of water at 1,950-53 ft. The 10-in. was cemented at 1,953 ft. The Sunburst at 1,690-1,720 ft. had a show of oil in the first 10 ft. of sand, followed by water.

The Montana-Dakota Utilities Co., unit operator for the Bowdoin field units, has resumed its drilling campaign with three completions and four new operations. The latter are scattered through

(Continued on Page 67)

INDIANA COMPLETIONS

Daviess County: R. D. Brown 6-C McCracken, S½ NE SE 16-2-6w, 1,039,000 cu. ft. gas, Cypress 730-38 ft.

Gibson County: Holland et al 1 Harrall, 550 ft. S line and 600 ft. W line Don. 96-1n-10w, dry, T.D. 1,833 ft.

M. D. Siegel 1 Armstrong, N½ SW SW Don. 68-1s-10w, dry, T.D. 500 ft.

McGinnis & Bittler 1 Michel, SW NE SE 26-1s-10w, pumped 35 bbl., Hardinsburg sand 1,331-39 ft., T.D. 1,348 ft.

J. W. Ginsburg 1 Steele, SW SE SW 26-2s-9w, dry, T.D. 1,250 ft.

Posey County: Jarvis Bros. 1 Walker, S½ NW SE 33-6s-12w, dry, T.D. 2,875 ft., Cypress 2,423 ft., Ste. Genevieve 2,700 ft., show oil 2,706 ft.

John Lindas 1 Stephen, NE NE SE 13-7s-13w, dry, T.D. 1,204 ft., sand 925 ft.

Pike County: Skelly 1 Sollman, SW SE NE 14-3s-7w, dry, T.D. 1,502 ft., Benoist sand 1,320 ft., show gas, McClosky 1,450 ft.

Siosi 1 Enos Coal Co., NE cor. 18-1s-8w, dry, T.D. 1,848 ft., P.B. 1,530 ft., bail 2 bbl. a day, sand 1,499-1,509 ft.

Vanderburg County: Princeton Mining Co. 1 fee, NW SE 9-6s-10w, dry, T.D. 1,000 ft., show oil in Stray sand 850-55 ft.

Warrick County: V. S. Hollingsworth 1 Lucinda Eyell, NE SW SE 36-6s-8w, dry, T.D. 1,846 ft., Ste. Genevieve 1,702 ft., McClosky 1,810 ft.

White County: Ohio 1 Walthen, SW SW NW 11-26-6w, dry, T.D. 1,060 ft.

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New McClosky Pool Southwest Of Carmi, White County

MATTOON, Ill.—The Illinois basin's most important completion during the past week was White Eagle Oil Co. 1 J. Britt, NE NW SE 23-5s-9e, a White County wildcat ½ mile south west of Carmi. After an acid treatment in the McClosky at 3,148-57 ft. oil rose 1,600 ft. in the casing. Initial production, it was estimated, would exceed 200 bbl. daily. Prior to the acid treatment the well recovered about 5 bbl. of fluid an hour of which 75 to 80 per cent was oil and the balance water and drilling mud. This discovery may result in town-lot development at Carmi if and when government drilling restrictions are lifted.

In Wayne County Sohio Production Co. 1 C. E. Harris, SW SE 19-1s-7e, north offset to the recent Deep Rock Oil Corp. discovery, 1 Blackburn, flowed 560 bbl. naturally in 15 hours and has been completed for an initial production of 800 bbl. in 24 hours. It is producing from the McClosky at 3,237-40 ft. Another new producer in the field is the United Production Co. 1 Cariens, SE NE 25-1s-7e, which flowed 130 bbl. of oil in 4 hours when plug was drilled to the McClosky. No. 1 Cariens is still testing.

Meanwhile, a south offset to the discovery was believed to be dry. The test in Deep Rock 1 John Sanford, SW NE 30-1s-7e. After plug was drilled to the McClosky at 3,196-3,201 ft., salt water and only a show of oil was baled.

Jefferson County Wildcat Recovers Oil From McClosky

Oil Carriers 1 Starr Brothers, N½ SW SW 1-3s-4e, 2½ miles southeast of Bluford, has been plugged back to set casing on the McClosky after being drilled to the St. Louis lime at a total depth of 3,214 ft. No. 1 Starr Brothers found a fair show in the McClosky at 3,125-30 ft. which yielded 560 ft. of oil, 540 ft. of salt water, and 130 ft. of oil-cut mud on a drill-stem test.

ILLINOIS COMPLETIONS

Wildcats

Bond County: W. C. McBride 1 R. V. Tollett, SE SW SW 30-4n-2w, dry at 1,320 ft., Glen Dean 833 ft., Golconda 886 ft., Cypress 980 ft., Paint Creek 1,070 ft., Renault 1,160 ft., Aux Vases 1,181 ft., Ste. Genevieve 1,226 ft., McClosky 1,304 ft.

Champaign County: R. F. G. Drlg. Co. 2 Reynolds, E½ NE SE 1-22n-7e, dry at 300 ft.

Christian County: R. H. Brians 1 O. Dorr, SE SE NW 15-13n-1e, dry at 1,275 ft.

Clay County: Ohio 1 Charles Mascher, NW NW NE 11-5n-7e, dry at 3,005 ft., Menard 2,177 ft., Waltersburg 2,226 ft., Vienna 2,281 ft., Tar Springs 2,298 ft., Glen Dean 2,359 ft., Hardinsburg 2,420 ft., Golconda 2,463 ft., Barlow 2,531 ft., Paint Creek 2,666 ft., Benoist 2,723 ft., Renault 2,780 ft., Aux Vases sand 2,808 ft., Ste. Genevieve 2,855 ft., McClosky 2,989 ft., St. Louis 3,003 ft.

Effingham County: N. V. Duncan 1 A. J. Thoele, NE SW 3-8n-7e, dry at 2,614 ft., Glen Dean 2,075 ft., Cypress 2,223 ft., Cypress sand 2,226 ft., Renault 2,408 ft., Aux Vases 2,420 ft., Ste. Genevieve 2,464 ft., Fredonia 2,499 ft., McClosky 2,535 ft.

Franklin County: Oil Carriers, Inc., 2 Franklin County Coal Co., W½ NW NW 22-7s-1e, dry at 2,825 ft., base Pennsylvanian 1,467 ft., Clore 1,624 ft., Tar Springs sand 1,780 ft., Glen Dean 2,001 ft., Golconda 2,124 ft., Barlow 2,269 ft., Paint Creek 2,482 ft., Renault 2,545 ft., Aux Vases 2,575 ft., Ste. Genevieve 2,622 ft., Fredonia 2,758 ft.

Hamilton County: Smokey Oil 1 M. E. York, NE SE NW 36-4s-7e, dry at 3,522 ft., base Pennsylvanian 3,268 ft., Glen Dean 2,730 ft., Golconda 2,877 ft., Paint Creek 3,154 ft., Benoist 3,202 ft., Renault 3,296 ft., Ste. Genevieve 3,379 ft., Fredonia 3,400 ft., McClosky 3,444 ft.

Marion County: Nat. Pet. 1 Crawford, E½ NW SE 15-4n-1e, dry at 1,270 ft., stratigraphic test.

Wayne County: Deep Rock Oil 1 L. A. Blackburn, NW NE 30-1s-7e, flowed 843 bbl., natural, McClosky 3,238 ft., T.D. 3,290 ft., P.B. 3,357 ft.

Fields

Allendale, Wabash County: Kneipp & Morgan 1 Cogan, NW SE SW 35-2n-12w, dry at 2,265 ft.

Boulder, Clinton County: Texas 2 Price Gray Comm., NE NE SW 35-2n-2w, pumped 35 bbl., 20-qt. shot 1,220-30 ft., Benoist 1,208-45 ft., T.D. 1,245 ft.

Texas 2 C. Murphy, NE SW NE 2-2n-2w, pumped 183 bbl., natural, Benoist 1,226 ft., T.D. 1,236 ft., P.B. 1,234 ft.

Bridgeport, Lawrence County: Ed Geick et al 3 Gutheridge, NW SW NW 29-3n-12w, pumped 82 bbl., 30-qt. shot 1,953-72 ft., Benoist 1,953 ft., T.D. 1,973 ft.

Dale, Hamilton County: Shell 2 Summers, NW NE NE 18-6s-7e, pumped 63 bbl., 20-qt. shot 3,035-48 ft., 10-qt. shot 3,022-28 ft., Aux Vases 3,000 ft., T.D. 3,057 ft.

Cameron Bros. 1 A. B. Anderson, SE SE 1-6s-6e, pumped 58 bbl., 60-qt. shot 3,005-35 ft., Aux Vases 3,003 ft., pay 3,003-23 ft., T.D. 3,036 ft.

Griffin, Wabash County: Longhorn 30 Helm, SW SW SE 22-3s-14w, flowed 950 bbl., 3,000 gal. acid, McClosky 2,832-36 ft., 2,860-65 ft., 2,867-74 ft., T.D. 2,874 ft.

Lawrence, Lawrence County: Henry Loeb 16 Vandermark, SW SE NE NE 3-2n-12w, dry, old well deepened from 1,651-2,000 ft.

Louden, Fayette County: Carter 3-D Ruth Musser, SW SW 2-8n-3e, pumped 36 bbl., natural, Devonian 3,034 ft., T.D. 3,118 ft.

New Harmony, White County: Haynes et al 1 F. M. Hon, S½ SW NE NE 9-4s-14w, dry at 2,944 ft.

Noble, Richland County: Clark & Burgett 1 Lenear, NW NW NE 24-4n-9e, pumped 24 bbl., 20-qt. shot 2,581-91 ft., pay 2,575-82 ft., T.D. 2,594 ft.

North Sims, Wayne County: Pure 1 Barnard, NE SW 17-1s-6e, pumped 26 bbl. oil and 56 bbl. water, 3,000 gal. acid, McClosky 3,130-35 ft., 3,157-68 ft., 3,209-11 ft., 3,223-25 ft., T.D. 3,258 ft.

(Continued on Page 68)

Fain-McGaha 1-A B. Dunigan, Lot 89, Godwin subd., De Witt C.S.L. Sur., flowed 235 bbl. in 6 hr. through 1-in. tubing choke after acid, lime 2,402 ft., T.D. 2,434 ft.

Rocky Mountain Area

(Continued from Page 66)

Township 32n-34e, being in Secs. 9, 10, 16 and 36.

Mountain Fuel Supply 2 Carl Allen, SE NE NW 32-12n-97w, Powder Wash field, northwestern Colorado, looks like a gasser at 4,006 ft., where the 8⅝-in. was cemented. It will be a ½-mile extension on the northeast.

COLORADO COMPLETIONS

Dry Lakes, Moffat County: C. R. Privett 1 Sutton, NE NE SW 1-5n-96w, T.D. 2,390 ft., dry in the Sundance.

East Hiawatha, Moffat County: Mountain Fuel Supply Co. 10 Florence Wilson, NW SE NW 23-12n-100w, T.D. 2,547 ft., perf. 2,258-2,314 ft., opposite second Wasatch sand, pumped 100 bbl.

WYOMING COMPLETIONS

La Barge field, Sublette County: Texas Co. 2-LX Government, SE SW SW 27-27n-113w, T.D. 1,190 ft., 8⅝-in. 1,031 ft., flowed 45 bbl. in 20 hr.

Rock River field, Carbon County: Ohio Oil Co. 14 State, NW NE SW 34-20n-78w, T.D. 3,723 ft., 7-in. 3,679 ft., pumped 180 bbl. from the Dakota.

MONTANA COMPLETIONS

Bowdoin field, Phillips County: Montana-Dakota Utilities 679, NW SE SW 30-32n-33e, T.D. 1,030 ft., Bowdoin sand 705-65 ft., Phillips sand 940-80 ft., 481,000 cu. ft. gas, R.P. 235 lb.

Montana-Dakota Utilities 681, SW NE SW 31-32n-33e, T.D. 1,015 ft., Bowdoin sand 715-75 ft., Phillips sand 950-90 ft., 560,000 cu. ft. gas, R.P. 250 lb.

Montana-Dakota Utilities 680, SW NE SW 29-32n-33e, T.D. 1,020 ft., Bowdoin sand 705-45 ft., Phillips sand 950-1,000 ft., 606,000 cu. ft. gas, R.P. 225 lb.

Cut Bank field, Glacier County: Santa Rita Oil & Gas 1 State, SE SE 12-33n-6w, T.D. 3,103 ft., Cut Bank sand 3,050-3,100 ft., swabbed 300 bbl.

Kevin-Sunburst field, Toole County: Enfield Oil Co. 7 Zacher, SW NE NW 20-35n-1w, T.D. 1,584 ft., acid, average 20 bbl. on 10-day test from Ellis-Madison contact.

UTAH COMPLETIONS

Vernal district, Uintah County: Union Oil Co. of California 1, NE SE 21-4s-20e, dry at around 2,600 ft., probably in the Sundance sand, show dead oil 1,400 ft.

W. Central Texas

(Continued from Page 58)

WEST CENTRAL TEXAS

COMPLETIONS

Wildcats

Callahan County: Ben Dansby, Jr., et al 1 W. A. Ramsey, Sec. 2277, T.E.&L. Sur., pumped 5 bbl. oil and 20 bbl. water after acid, lime 3,233-77 ft., T.D. 3,277 ft., *discovery*.

Coleman County: North-South Oil 1 Mrs. Bennie M. Smith, Brooks & Burleson Sur. 1, dry, not plugged, T.D. 4,547 ft.

Hood County: Aztec Oil 1 C. B. Reese, William R. Prewitt Sur. 1989, dry, T.D. 2,611 ft.

Taylor County: Tom B. Medders et al 1 J. W. Moore, Sec. 74, Blk. 19, T.&P. Sur., dry, T.D. 3,265 ft.

Fields

Lewis, Jones County: Algord Oil 1 J. T. Badgett, Sec. 5, Blk. 15, T.&P. Sur., pumped 148 bbl. after shot, sand 1,913-25 ft., T.D. 1,942 ft., P.B. 1,937 ft.

Southwest McMillian, Runnels County: Art Tucker et al 4 J. L. King-A, Sec. 51, D. Diaz Sur. 532, pumped 52 bbl. oil and 5 bbl. water natural, sand 2,307-17 ft., T.D. 2,317 ft.

Wimberly, Jones County: Maricaibo Exploration 1 W. C. Church, Lot 88, Godwin subd., De Witt C.S.L. Sur., flowed 158 bbl. in 3 hr., est. 600 bbl. a day, lime 2,299-2,315 ft., T.D. 2,327 ft.

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SOUTHWEST TEXAS

Gas-Distillate Production Opened in DeWitt County

By F. L. SINGLETON

CORPUS CHRISTI, Tex. — Interest in Wilcox sand development in the Southwest Texas sector was heightened the past week with the opening of gas-distillate production in the Nordheim area, De Witt County. The discovery well, Tide Water 1 Gips, 11 miles southwest of the town of Yorktown, was flowing at the rate of 4 bbl. of 53-gravity distillate per hour through a ¼-in. choke while testing through perforated casing opposite the Wilcox sand at 8,336-44 ft. Tubing pressure was 1,100 lb., and casing pressure 1,300 lb. The gas volume was estimated at 2,000,000 cu. ft. daily. A series of tests will be made of this sand and the well is then expected to be killed and other tests made at 8,200 ft., 8,100 ft., and 7,000 ft., where electrical surveys and drill-stem testing showed possible production. This is the third Wilcox sand discovery to be found in the county, being located southwest of the Yorktown field and northwest of the Thomaston field.

As the above well was being tested, additional Wilcox sand development was announced for Gonzales and Karnes counties. Six miles southeast of the town of Kenedy, Karnes County, Dan Auld let contract for an 8,500-ft. test located on the Ruth Ingram lease in the Carolos Martinez grant. This is a geophysical prospect in which protection is held by Transwestern Oil Co., Arkansas Fuel Oil Co., Phillips Petroleum Co., and Adams Oil & Gas Co. To the north in Gonzales County, and 8 miles south of the town of Gonzales, Continental staked location for 1 Edwin F. Burns in the W. Newman Survey. This is a projected 8,000-ft. test and it is situated about 1 mile south of a dry hole.

In La Salle County, 12 miles southeast of Cotulla, Royal Oil & Gas Co. 1 Matthew Cartwright, E. S. Buckely Survey, was bottomed at 5,606 ft., and casing may be cemented to test sand at 4,706-13 ft., where a recent drill-stem test recovered some oil-cut mud.

Holland Oil Co. 1 Boysen, the discovery well of the Poth field, Wilson County, has been officially completed on the pump for an initial production of 5 bbl. oil and 20 bbl. salt water per day. Production is from the Wilcox at 4,091-96 ft. While the completion of this well failed to come up to expectations it definitely enhances exploration along the updip sector of the trend and will lead to considerable exploration. One of the latest tests to be announced for the county since the completion of the well is to be drilled by the Diamond Half Oil Co. about 6 miles northeast of the discovery, a 4,700-ft. test.

An east extension of about 3,900 ft. was definitely opened in the Seeligson field, Jim Wells County, as Humble 1 King was flowing pipe-line oil while testing through perforated casing at 5,953-6,001 ft. In addition to extending production the well established production from a thick sand section at 4,600 ft., and has logged the upper sands which produce in the field proper. The completion extends production into Kleberg County.

H. R. Smith 1 Koehler, an old well formerly completed as a gas well and which was considered as an extension to the Orange Grove field, flowed 162 bbl. daily through a 5/32-in. choke after plugging back and completing through perforated casing at 4,865-70 ft. The operators have asked that the well be named the Quinto field.

SOUTHWEST TEXAS COMPLETIONS

LOWER GULF COAST DISTRICT

Wildcats

San Patricio County: George Buescher 1 Willis, dry, T.D. 6,540 ft.

Nueces County: F. A. Gillespie 1 Ballard, dry, T.D. 7,510 ft.

LaTecas 1 Jalufka, dry, T.D. 7,480 ft.

Fields

Odem, San Patricio County: Seaboard 2 Burrows, 99 bbl., ⅛-in. choke, perf. casing 5,431-36 ft., T.D. 5,557 ft.

Commercial Production Co. 1 Lane, dry at 7,302 ft.

Republic Natural Gas Co. 2 Lane, 1,500,000 cu. ft. gas, perf. casing 3,512-22 ft., T.D. 6,912 ft.

Seeligson, Jim Wells County: Transwestern 12 Dunlap, 142 bbl., 5/32-in. choke, perf. casing 6,032-36 ft., T.D. 6,675 ft.

LAREDO COMPLETIONS

Wildcats

Duval County: Guy Warren 4 Driscoll, dry, T.D. 3,244 ft.

Fields

Blas Urbe, Zapata County: Bob Barker 1 Bruni, dry, T.D. 1,805 ft.

East Cole, Duval County: Leach & Johnson 4 Benavides, 19 bbl., pumping, top sand 1,725 ft., T.D. 1,727 ft.

Colorado, Jim Hogg County: Sun 5-B T. T. East, 68 bbl., 12 hr., ⅞-in. choke, sand 3,009-17 ft., T.D. 3,017 ft.

North Moca, Webb County: Magnolia 1 Duval County Ranch Co., 15 bbl., pumping, T.D. 2,638 ft., P.B. T.D. 1,971 ft.

Washburn, La Salle County: Quintana 12 South Texas Syndicate, dry, T.D. 5,737 ft.

SOUTH CENTRAL TEXAS DISTRICT

Fields

Pendencia Creek, Dimmit County: Wellington 3-B Sullivan, dry, T.D. 1,932 ft.

Illinois Fields

(Continued from Page 67)

Ben Taylor et al 1 Dickey, NE NE 20-1s-6e, pumped 88 bbl., perf. 3,155-67 ft., 1,000 gal. acid, reacidized 2,000 gal., McClosky 3,158-63 ft., T.D. 3,201 ft.

Roland, White County: Carter 1 Charles Bryant, SE SW 15-7s-8e, flowed 41 bbl. oil and 17 bbl. water, natural, Waltersburg sand 2,135-54 ft., pay 2,156-61 ft., T.D. 2,167 ft., P.B. 2,128 ft.

Sailor Springs, Clay County: W. C. McBride 1 Harrison Comm., SE SE SW 34-4n-7e, pumped 51 bbl., 7-qt. shot 2,602-10 ft., Weller 2,600 ft., T.D. 2,610 ft.

Stokes, White County: Pure and Carter 2 H. Martin, W½ E½ SE NW 18-6s-9e, pumped 8 bbl. oil and 58 bbl. water, 65-qt. shot 2,820-48 ft., Paint Creek sand 2,814-43 ft., T.D. 3,098 ft.

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NORTH LOUISIANA, ARKANSAS

Deep Lisbon Test Tries For Smackover Production

SHREVEPORT, La. — Union 1-B Meadows, located in the Lisbon field, Claiborne Parish, is bottomed at 10,266 ft. and casing is being cemented for a production test. The Smackover lime was topped at 10,230 ft., and the well attempted to blow out at 10,256 ft. From 10,256-66 ft., 10 ft. of porous lime with a good odor of gas and distillate was recovered. Location is in 13-21n-5w.

California 1 Pan American Life Insurance Co., a new Wilcox sand discovery in the Ferriday area, Concordia Parish, was officially completed for an initial production of 136 bbl. of oil daily flowing through a 16/64-in. choke. Gravity of the oil was 44. This well was completed the previous week by perforating casing opposite the Wilcox at 4,567-71 ft. In addition to the Wilcox sand, gas-distillate production was produced from the Tuscaloosa sand at 8,935-46 ft., before plugging back to the Wilcox. Production from the deeper pay is of particular importance as it is expected to result in deeper exploration along the trend. The same company's 2 Pan American Life Insurance Co., 16-9n-10e, several hundred feet from the discovery, flowed 124 bbl. daily through a 16/64-in. choke from the Wilcox at 4,554-75 ft. Geological tops on both producers have not been released by the company.

H. L. Hunt F-24 Goodpine Oil Co., a prospective pool opener, northwest of the Winn field, Winn Parish, is temporarily shut down at 8,905 ft. after cementing 7-in. casing at 6,095 ft. The operator is keeping steam up but there is no information as to when the well will be tested.

ARKANSAS COMPLETIONS

Midway, Lafayette County: Barnsdall 2 Community-Powell, SW NW 10-15-24, flowed 24 bbl. an hr. through choke, Smackover 6,405 ft., T.D. 6,475 ft.

McKamie, Lafayette County: Atlantic Ref. 1 Armour-Bodcaw, CSE 32-17-23w, abandoned location.

Village, Columbia County: E. G. Bradham 1 Tissue, NW SW 14-17-19w, flowed 195 bbl., Smackover 7,403-4 ft.

NORTH LOUISIANA COMPLETIONS

Haynesville, Claiborne Parish: Phillips Pet. 1 Eliza, 11-23-8, flowed 38 bbl. an hr., perf. 5,249-74 ft., T.D. 5,340 ft.

R. A. Stacy 1 Taylor, SW SW 16-23-8, flowed 35 bbl. an hr., perf. 5,319-86 ft., T.D. 5,435 ft.

Blackwell Oil & Gas 1 Taylor, SW NE 10-23-8w, flowed 1,680 bbl., Pettit 5,325-50 and 5,370-75 ft., T.D. 5,455 ft.

Pine Island, Caddo Parish: Kennedy & Bachelor 10 Muslow, SW NW NW 5-20-15w, pumped 75 bbl., T.D. 1,935 ft.

MISSISSIPPI COMPLETIONS

Madison County: Phillips Pet. 2 Whitworth, NW SE 4-11n-3e, flowed 325 bbl., Eutaw 4,835-40 ft., T.D. 4,910 ft.

Wildcat, Winston County, SW of Fearns Springs: Garson & Grober 1 Chancellor, SW SE 9-13n-14e, dry, T.D. 4,020 ft.

ALABAMA COMPLETION

Wilcox County, 3 miles W of Allenton: Reid Clark 1 McWilliams, NW NW SE 9-11n-10e, dry, T.D. 3,327 ft.

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Canadian Fields

(Continued from Page 62)

sand. Commercial production would open a new area some 15 miles west of the proven field.

Tar Sands Project

Following a preliminary report to the federal government by a committee which some weeks ago investigated the possibility of economic development of the northern Alberta tar sands, the government has requested the Consolidated Mining & Smelting Co. to make a more detailed study of the project. A conference of engineers and officials of the company, with representatives of Abasand Oils and others interested, was held at Edmonton this week, following which Consolidated engineers will again visit the tar-sand area. W. S. Kirkpatrick, manager of Alberta Nitrogen Products, Ltd., a Consolidated affiliate, is taking a leading part in the work.

LEGAL

United States Department of the Interior, District Land Office, Salt Lake City, Utah. Notice is hereby given that the lands herein described within the known geologic structure of the Cisco Dome Gas Field, Utah, are offered to qualified bidders of the highest amounts offered per acre as a bonus for the privilege of leasing the land under Section 17 of the leasing act, as amended by the act of August 21, 1935 (49 Stat. 674; 30 U.S.C. 226) at a sale to be held in the United States Land Office at Salt Lake City, Utah, at 10:00 o'clock a.m., August 12, 1942, in the following units: Parcel No. 1, T. 20 S., R. 21 E., sec. 1, lot 4, S½NW¼, SW¼, NW¼SE¼, S½SE¼, sec. 12, NW¼; Parcel No. 2, T. 20 S., R. 21 E., sec. 3, lots 1, 2, S½NE¼, SE¼ sec. 10, E½; Parcel No. 3, T. 20 S., R. 21 E., sec. 3, lots 3, 4, S½NW¼, SW¼, sec. 10, W½; Parcel No. 4, T. 20 S., R. 21 E., sec. 4, SE¼NE¼, NE¼SE¼, S½SE¼; sec. 9, E½; Parcel No. 5, T. 20 S., R. 21 E., sec. 11, all; Parcel No. 6, T. 20 S., R. 21 E., sec. 12, NE¼, S½; T. 20 S., R. 22 E., sec. 7, lots 2, 3, 4, SE¼SW¼; Parcel No. 7, T 20 S., R. 22 E., sec. 18, lots 1, 2, 3, 4, SW¼NE¼, E½NW¼, E½SW¼, NW¼SE¼, S½SE¼, sec. 19, lots 1, 2, E½NW¼; Parcel No. 8, T. 20 S., R. 21 E., sec. 13, all; Parcel No. 9, T. 20 S., R. 21 E., sec. 14, N½, NW¼SW¼, S½SW¼, SE¼; Parcel No. 10, T. 20 S., R. 21 E., sec. 15, all; Parcel No. 11, T. 20 S., R. 21 E., sec. 21, E½NE¼, sec. 22, N½, N½SW¼, SE¼; Parcel No. 12, T. 20 S., R. 21 E., sec. 23, all; Parcel No. 13, T. 20 S., R. 21 E., sec. 24, all; Parcel No. 14, T. 20 S., R. 22 E., sec. 19, lots 3, 4, NE¼, E½SW¼, sec. 20, NW¼NW¼, S½NW¼; Parcel No. 15, T. 20 S., R. 22 E., sec. 20, W½SE¼, sec. 29, E½; Parcel No. 16, T. 20 S., R. 22 E., sec. 20, SW¼, sec. 29, W½; Parcel No. 17, T. 20 S., R. 22 E., sec. 30, lots 1, 2, 3, 4, E½, E½W½; Parcel No. 18, T. 20 S., R. 21 E., sec. 25, all; Parcel No. 19, T. 20 S., R. 21 E., sec. 22, SE¼SW¼, sec. 26, N½, N½SE¼, SE¼SE¼, sec. 27, N½NE¼, SE¼NE¼; Parcel No. 20, T. 20 S., R. 22 E., sec. 31, lots 1, 2, 3, E½, E½NW¼, NE¼SW¼; T. 21 S., R. 22 E., sec. 5, NW¼NW¼ (unsurveyed), sec. 6, NE¼NE¼ (unsurveyed). Each lease will be made subject to the unit plan for the Cisco Dome Unit Area, Utah, approved June 6, 1942. Mimeographed copies of the plan will be available for distribution to parties interested in bidding at the local land office in Salt Lake City, Utah, and offices of the oil and gas leasing division, Geological Survey at Salt Lake City, Utah, Casper, Wyoming, and Washington, D. C. Upon acceptance by the Secretary of the Interior of any bid for the unsurveyed tracts they will be surveyed at Government expense. Each successful bidder must deposit on date of sale with the officer in charge of the sale a certified check on a solvent bank or cash for one-fifth of the amount bid by him and file a showing of qualifications to receive a lease as required by section 7 of circular 1386. The remainder of the bonus bid and annual rental must be paid prior to the issuance of the lease. Bids may be submitted for two or more parcels regardless of the acreage involved since each lease will be made subject to and operated under a prescribed unit plan of development and operation. Bidders are warned against violation of section 59, United States Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids in the discretion of the Secretary of the Interior. Register.

LEGAL

United States Department of the Interior, District Land Office, Evanston, Wyoming. Notice is hereby given that the oil and gas deposits in the NW¼SE¼ Sec. 27, T. 27 N., R. 113 W., 6th P.M., La Barge field, Wyoming, are offered to the responsible qualified bidder of the highest bonus per acre for a lease under Section 17 of the amendatory leasing act of August 21, 1935 (49 Stat. 674) at the royalty rate scale in the lease form shown in Circular 1386 at a sale to be held in the district land office, Evanston, Wyoming, at 10:00 A.M. on July 14, 1942. The successful bidder must deposit with the Register on the date of sale a certified check on a solvent bank or cash for 1/5 of the amount bid and file the showing of qualifications to receive a lease as required by Section 7 of Circular 1386. The remaining 4/5 of the amount of the bid, together with the first year's rental of $1.00 an acre must be paid and a $5000 corporate surety bond furnished prior to issuance of the lease. All bidders are warned against violations of the provisions of Section 59 of the United States Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids at the discretion of the Secretary of the Interior. Register.

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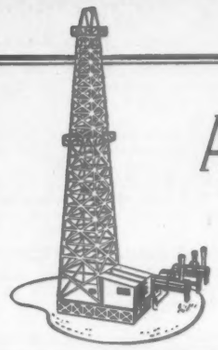

Among the Drilling

BREWSTER-BARTLE Drilling Co., Houston, Tex., drilling for the Ohio Oil Co. in the North Bay City area, Matagorda County, Texas, was preparing to retest 1 McDonald, a prospective pool opener. The well flowed gas when tested in sand at 8,300 ft. Additional sands up the hole showed production possibilities on drill-stem tests.

FITZPATRICK Drilling Co. opened a new Wilcox sand field in the Southwest Texas sector with the completion of Tide Water 1 Gips, 11 miles southwest of Yorktown, De Witt County. The well is flowing at the rate of 4 bbl. of distillate per hour through a ¼-in. choke from perforated casing opposite sand at 8,300 ft.

DAN AULD was scheduled to let contract for an 8,500-ft. Wilcox test located on the Ruth E. Ingram lease, 6 miles southeast of the town of Kenedy, Karnes County, Texas. The well is being supported by several major companies.

Continental Oil Co. staked location for an 8,000-ft. Wilcox test, 7 miles south of the town of Gonzales, Gonzales County, Texas. Location is in the W. Newman Survey. Contract is expected to be let at an early date.

GRAY & WOLFE, Houston, Tex., spudded their 1 Grogan-Cochran Lumber Co., a semiwildcat southwest of the Lake Creek field, Montgomery County, Texas. The projected depth is below 10,300 ft.

ROWAN & HOPE, San Antonio, Tex., started drilling operations on 1 Kasper, a wildcat in Jackson County, Texas, which is being drilled jointly with John Mayo et al.

PETROLEUM Well Service Co., Houston, Tex., has apparently opened a new field in Jackson County, Texas, with the recovery of pipe-line oil in W. Stewart Boyle 1 Rose & Sample, about 1½ miles west of the Ganado field. Drill-stem testing at 4,900 ft. recovered 26-gravity oil. The well will be drilled to a contract depth of 5,600 ft. before casing is cemented for completion.

H. R. BURDIN, Kilgore, Tex., has a 5,000-ft. contract for Dick Andrade 1 W. J. Schenck, a wildcat in the Mary Lathan Survey, over 2 miles southwest of the discovery well of the new Club Lake field in Hunt County, Texas, which was reported running about level with the discovery at the top of the Woodbine pay zone.

SOUTHERN Drilling & Well Service Co., Houston, Tex., received contract from Earl Hankamer for a 4,000-ft. test on the southeast flank of the old Sour Lake dome, Hardin County, Texas. The well is 1 C. G. Hooks in the S. Jackson Survey.

F. B. PAINE Drilling Co., Dallas, Tex., has the contract for Hanlon-Buchanan, Inc., 1 Porter, new test in the Hoefle area of Jack County, North Texas.

C. C. GIGLER, Houston, Tex., is contractor on First National Petroleum Trust 1 M. G. Armstrong, Simpson Holloway Survey, west-flank test at the Waskom field in southeastern Harrison County, Texas, which will seek the lower Trinity pay zone.

KNAPPENBURGER & HARPER, Graham, Tex., are ready to begin fishing for stuck tools at Joe Worsham 1 Hensley, a wildcat 5 miles south of Jacksboro in Jack County, Texas, after replacing lighter equipment with a heavy rotary rig. Gas at 5,300 ft. blew the tools up the hole. Operators will sidetrack the hole if tools are not recovered.

M. R. SLATSBURG, Kilgore, Tex., was starting a Paluxy sand wildcat in Morris County, Texas, about 3 miles northwest of Daingerfield, for R. T. Lester and J. M. Buchanon, Evansville, Ind. Location of the well is on the Mary John Cason tract in the William O. Matthews Survey.

GEORGE LIVERMORE, Odessa, Tex., has the contract for Amon G. Carter 1 W. Claer, Labor 22, League 263, Kent C.S.L. Survey, a 5,500-ft. wildcat in the extreme northern part of Martin County, West Texas, just south of the Dawson County line. The well was spudded last week to beat a June 30 deadline.

UNGREN & FRAZIER, Abilene, Tex., have the contract to drill George Byram and Cardinal Oil Co. 1 Priscilla Williamson, Section 31, Block 18, T. P. Survey, wildcat in Jones County, Texas. The well is contracted to 3,100 ft., which should take it into the Swastika formation.

BIG WEST Drilling Co., Dallas, Tex., has the contract to drill Stanolind Oil & Gas Co. 1 Huddleston, Block 9, Falls Survey, Wise County, Texas, but is not to start operations for another month. The test is to go to 7,300 ft.

LIMA Drilling Co. has the contract for Mogul Oil Co. 1 Julia Miscisin, in C SE NE 31-19n-4e, Arenac County, Michigan.

A. Z. SKEETERS, Kilgore, Tex., has staked location for his own well on the G. W. Hanson estate in the Stephen Englis Survey in Shelby

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Contractors

County, Texas, northeast of Center. Mr. Skeeters has a block of 1,500 acres and plans tests of several formations.

WYNN CROSBY Drilling Co. and J. K. Dorrance have staked location for a wildcat test 660 ft. out of the west corner of the Thomas Habermacher Survey, 5 miles west of Clodine in Fort Bend County, Texas. Projected depth is 8,000 ft., and the test was scheduled to start drilling the first of this week.

C. W. TEATER is contractor for Grale Oil Co. 1 F. W. Sommerville, NW SE NE 12-8n-1w, Clinton County, Michigan.

GRAHAM POWELL, Centralia, Ill., has the rotary-drilling contract for a new wildcat Benoist test for Fayette County, Illinois, the C. H. Harrison 1 Branum, NW NW NW 4-6n-1w. The test was delayed in getting started due to unseasonal rains that have retarded development generally in the state.

PEERY & MEREDITH, Wichita Falls, Tex., have the contract for Sinclair Prairie 1 Freeman, a 7,200-ft. wildcat in Grayson County, Texas, 3 miles south of Denison in B.B.B. &C. Survey A-149.

HOLLANDSWORTH Drilling Co. reported final gage last week on its 1 J. D. Baker, John Warren Survey, Club Lake field sand discovery southeast of Greenville, Hunt County, Texas, giving it 266 bbl. of 39.5-gravity oil daily on flow through ¼-in. choke. Total depth is 2,778 ft.

A. B. COBB has the drilling contract for the fourth important wildcat test of the year in northern Montana, which will be drilled by Reagan and associates, of Cut Bank, Mont. This is the firm's No. 2 well on Mission structure, northwest of Cut Bank field, in C NW NE 27-37-7w. Rotary tools will be used.

TRIANGLE Drilling Co., Shreveport, La., was starting the 1-B Murff, in Bossier Parish, Louisiana, in NE of 19-17n-11w, the Sligo area. Triangle also has the contract for Carter Oil Co. 2 Stevenson et al, in NW of 12-19n-6w, at Sugar Creek, Claiborne Parish, Louisiana.

COOK Drilling Co. has the contracts for T. L. James & Co. 1 Waller-Taylor, SE 11-23n-8w, and the 1 Winn estate, SW 26-23n-8w, at Haynesville, Claiborne Parish, Louisiana.

TEXAS HARVEY Oil Co., Dallas, Tex., is using its own rig on a proposed Woodbine sand oil test in the Reklaw area of eastern Cherokee County, Texas. The well will be the 1 Lottie Priest, staked 660 ft. from the north and east lines of a 150-acre tract in the James Cooke Survey. Derrick was being built late last week. The test will go to 4,600 ft. and spudding is set for the middle of July.

UNION ROTARY Corp. was rigging up rotary tools on Sun Oil Co. 1 Mead, SW SW SW 10-3n-9w, Rutland Township deep test in Barry County, Michigan. The test will be drilled all the way to the St. Peter formation, approximately 5,000 ft., with rotary tools. The Sun test is a mile east and a mile south of the 1 Kidder, drilled to the St. Peter formation in 1940 and logged free oil and gas in that formation.

W. SPENCER COOK is the contractor for the Charles W. Cook 1 George Brandt, NE SE SE 21-3n-15w, Allegan County, Michigan.

CROW Drilling Co. has contract from Carter Oil Co. for its 1 Eltiste, SE NE 2-3-19w, in the Dayton pool of Phillips County, Kansas. It will be a ½-mile-south extension to the present limits of the field.

GOLL, GRAVES & MECHLING, Inc., is the contractor for the Basin Oil Co. Andrew Miscisin, C SW SE 30-19n-4e, Arenac County, Michigan.

MUSKEGON Development Co. is contractor for Chapman Oil Co. 1 Macey-Moeller, C N½ NW SE 34-15n-4e, Bay County, Michigan. The company also has the contract for Chapman Oil Co. 1 Fred and Martha Wendt, C S½ SE NW 34-15n-4e.

EARL HESTER has the drilling contract for the Calhoun, Jones & Gower 1 McCoy, which has been staked in Richland Parish, Louisiana, in SE 29-16n-6e, the Richland pool.

N. H. WHEELAS Drilling Co. is the contractor for Carter Oil Co. 1 Henrietta Jacoby, SE SE 34-14n-11e, a wildcat test in Tensas Parish, Louisiana.

O. L. JOHNSON, Fort Worth, Tex., is starting three 2,800-ft. wildcat tests in Comanche County, West Central Texas. The 1 Hodges is in Section 11, Block 2, of H.&T.C. Survey, 11 miles west of DeLeon; the 1 Hattox is in Section 11, Block 2, H.&T.C. Survey, a mile west of Hodges, and the 1 Hutchinson is in the T. Hutchinson Survey, 3½ miles northwest of Comanche. Work is starting at each.

Crew of Humble Oil & Refining Co. at Bayou Sale, Louisiana. F. Abendrath, district engineer; J. W. McDowell, driller; J. A. Stewart; G. W. Johnson; Hugh Harris, and Fat Langford, district superintendent

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Review of Secondary Recovery In the United States

(Continued from Page 20)

of wells, and the inability to set packers to prevent bypassing, on account of previously shooting of the sand section, are believed to be the principal reasons for the lack of more satisfactory results from repressuring attempts in the Clinton fields.

Air and gas repressuring has been practiced on an extensive scale in the shallow fields of southeastern Ohio for many years. In fact, it was in these fields that systematic repressuring had its origin. Some of the projects have been in more or less continuous operation for over 40 years, and the time has now arrived when they have reached the stages of final exhaustion, in so far as secondary-recovery operations are concerned. Quite a few of the repressuring projects recently have been curtailed or abandoned. This has been accompanied elsewhere in the state by a progressive abandonment of other fields, in which secondary-recovery methods have not been applied, to the extent that currently six wells are being abandoned for every new well drilled. This trend, if not arrested, in due course of time will eliminate the oil business in Ohio. Under existing rather unfavorable economic conditions, it is very doubtful whether it would be profitable to redrill many of the fields now being abandoned for the application of secondary-recovery methods. Thus, it is probable that considerable recoverable oil is being lost because it is not profitable at the present time to try to maintain production.

Nothwithstanding the generally dismal present picture for the future of the oil industry in Ohio, there is one field, in which secondary-recovery methods are being applied, which appears to have promising possibilities. This is the Chatham field in Medina County where 10 separate water-flooding projects are now in various stages of early development. The Chatham field produces from the Berea sand, which is found at a very shallow depth and which had a very good primary production history. It covers only about 1,500 acres, part of which is probably of marginal quality. On this account, the field's production, even if it were entirely developed, probably would not balance the continued decline in other parts of the state. However, if the water-flooding operations at Chatham are as successful as present production indicates that they may be, it is entirely possible that other Berea sand fields may react favorably to the application of the same method, thus resulting in the reclamation of important reserves of oil which otherwise likely will be lost.

Kentucky

The oil fields of Kentucky, similarly to those of other states, may be separated into districts or groups based upon their geographic location and the geologic age of the producing horizons. In eastern Kentucky, the group of fields located on the Paint Creek uplift, producing from the Wier sand, has been an important source of primary production in the past. At the present time they are the scene of considerable secondary-recovery activity. Gas repressuring in a somewhat unsystematic manner was first commenced in Kentucky in these fields. The results from the original tests were largely none too encouraging, but the experience gained from these early operations pointed the way to better planned and operated projects which are now yielding very satisfactory production. Cores of the Wier sand from several of the Paint Creek uplift fields indicate that the Wier should be adaptable to water flooding, and it is believed that greatly expanded secondary-recovery activity will take place in these fields in future time.

Air and gas repressuring have been applied with exceptional success in the Corniferous lime fields of east-central Kentucky. Notwithstanding a scarcity of gas for repressuring purposes, the results from several projects in the Big Sinking and Irvine-Furnace fields will probably be comparable to any in the United States. The fact that repressuring in these fields is being conducted successfully in a lime and sandy lime reservoir is especially significant.

Air and gas-repressuring methods, on a somewhat less extensive scale, are being applied in the limestone fields of southwestern Kentucky and in the shallow sand fields located in the West Kentucky coal basin. The projects now in operation in these areas have indicated that more systematic and intensive development should result in the profitable recovery of large additional quantities of oil.

Illinois

Secondary-recovery operations were beginning to receive considerable attention in the older fields of Illinois prior to the discovery of prolific production in several new fields of the central Illinois basin. The availability of much, unrestricted, flush production in Illinois during recent years has tended to discourage secondary-recovery activities, although pressure-maintenance projects have been installed in a few of the larger and more important fields.

The rapid dissipation of reservoir energy in certain Illinois fields, producing under internal gas drive, probably will result in an inefficient recovery of oil by natural methods of production, leaving much of the original content in the reservoirs which may be recovered partially at a later time by the application of secondary-recovery methods. The success of a few secondary-recovery projects in the state points to the distinct possibility that both water flooding and air and gas repressuring may be applied widely in Illinois and result in a greatly increased recovery of oil. Some of the producing horizons, such as the Robinson, Kirkwood, and McClosky, from the standpoint of physical characteristics, are believed to be very well adapted to secondary-recovery operations.

Kansas

Secondary-recovery operations in Kansas, both water flooding and air and gas repressuring, include quite a few systematic and well-managed projects, the most of which are located in the shallow fields in the southwestern part of the state producing from the Bartlesville sand, of lower Pennsylvanian age, or sands of equivalent geologic age occurring in the lower part of the Cherokee formation. Some of the results from secondary-recovery operations in Kansas have been outstanding; others have been mediocre; and there have been some outright failures. However, it can be said that the results from most of the secondary-recovery operations in Kansas show evidence of competent supervision which has been responsible for very substantial increases in oil production.

Many of the projects in Kansas are still in the initial stages of development, so there are not many historical records of production available for study. However, the upward trend of production in quite a few projects would indicate that a highly efficient recovery will be obtained, which should be comparable to the better operations in other states. It also appears likely that many of the younger and deeper fields will respond favorably to secondary operations at later time when a greater demand for oil will justify larger expenditures for development. This statement is restricted to the fields whose primary production has been obtained largely by internal gas drive, and does not apply to the fields producing from Ordovician reservoirs where there is an active natural water drive. However, even with the exclusion of the Ordovician fields, the future application of secondary-recovery methods in Kansas appears to have most promising possibilities, and undoubtedly will receive more and more attention in succeeding years.

Louisiana

Major secondary-recovery projects are in the Haynesville and Homer fields of Louisiana at the present time. The Haynesville project is nearing the point of ultimate depletion after resulting in the additional recovery of a very substantial quantity of oil. Secondary-recovery operations in the Homer field have been developed in the past on a moderate scale, but have yielded very promising results. It is believed that the secondary recovery of oil from the Nacatoch sand in the northern segment of the Homer field, when it may be repressured in an intensive manner, will approach the prolific recovery obtained by natural methods of production. The secondary-recovery operation at Homer is a model of cooperative agreement among various companies and should serve as a useful guide for the development of similar projects elsewhere.

The possibilities for the application of secondary recovery methods in other fields of North Louisiana are, to a certain extent, unknown in so far as actual field tests are concerned. Some of the older fields have experienced fairly active water encroachment, and it is quite possible that the oil content of the reservoirs has been lowered to a marginal point. In other of the older fields there was an enormous waste of gas from gas caps, with a consequent dissipation of effective reservoir energy, during the early stages of development. Recent studies of certain of these fields have revealed the existence of very large reserves of oil which have been left in the reservoirs, unaffected by primary production, in an essentially stagnant condition and probably in almost their original volume. It is entirely conceivable that a moderate restoration of pressure in such reservoirs would bring them back to a high productive capacity. With large, proven reserves of oil remaining in some of the older fields, and with the success of repressuring already established in the Homer field, it would appear that the future for further application of secondary recovery methods in North Louisiana is highly promising.

In South Louisiana most of the oil fields are associated with uplifts which have resulted from some type of salt intrusion. These fields, in general, are affected by active water drives, and pressures can be maintained in most of them by curtailed withdrawals of crude. In a few fields, where the structure is complicated by faulting or where it is believed that water encroachment will not be effective, high pressure is being maintained in the reservoirs by the injection of recycled gas. Some of the best examples of primary pressure control are in operation in South Louisiana fields.

The prospects for successful application of secondary-recovery methods in most of the fields of South Louisiana are rather remote. Properly controlled production should result in a very efficient recovery of oil, and, on account of the considerable depth of many of the fields, it is doubtful whether secondary-recovery operations would ever be economic for the production of such minor quantities of residual oil as may be left after depletion by primary production methods.

Personal Paragraphs

ALBERT B. HOCKMAN, who has been an engineer in the production department of Shell Oil Co., Inc., in the San Joaquin Valley, has been appointed assistant engineer in the manufacturing department of Shell at the Wilmington, Calif., refinery and has moved to Long Beach.

Several phases of recycling operations were discussed at the meeting of the Dallas (Tex.) Petroleum Engineers Club by ED H. SELECMAN and L. T. POTTER of the Lone Star Gas Co., Dallas, and J. R. BUTLER of the Cotton Valley Operators Committee, Cotton Valley, La.

HAROLD R. SELLS, engineer with Kerlyn Oil Co., has been transferred from Oklahoma City, Okla., to Sunray, Tex.

N. H. JAMES, engineer of Stanolind Oil & Gas Co., has been transferred from Refugio, Tex., to the Tulsa office.

R. S. McFARLAND, vice president of the Seaboard Oil Co., at Dallas, Tex., has recently returned home from a 10-day fishing trip on the Gulf Coast and Mexico.

FRANK W. ABRAMS, director, Standard Oil Co. of New Jersey, was recently presented with a gold service emblem in recognition of his 30 years of service with the company

W. H. RUHLEN heads a field party Gulf Research & Development Corp. has sent to Alberta, Canada, to carry on geophysical surveys in various parts of the province.

J. E. BRANTLY, president of Drilling & Exploration Co. at Dallas, Tex., has returned from a trip to South America. The firm has been drilling for Brazilian Government.

W. A. DRAKE, gasoline-plant superintendent for Humble Oil & Refining Co. in the Flour Bluff, Texas, field, has been transferred to the Lirette, Texas, district, as district superintendent.

MAJ. JOHN L. MILLER, formerly superintendent of Shell Oil Co., Inc., Deer Park refinery, at Houston, Tex., is now in Australia where he is on special assignment to work on the problem of transportation, procurement and supply for the Allied forces.

ROBERT KAHL, assistant purchasing agent for Kewanee Oil Co., Tulsa, has left for Miami Beach, Fla., to receive officer's training in the Army Air Corps. He had been with the oil concern since 1935.

JOE DOCTER, widely known among eastern oil men, has joined Laidlaw & Co., New York, as petroleum specialist. He formerly served in the same capacity with McKay & Co., which has now merged with the continuing firm.

HARRY H. JOHNSON, formerly in Gulf Oil Corp.'s Midland, Tex., office and later in the executive department at Houston, Tex., until inducted into the Army with a Texas National Guard unit, now has brigadier general preceding his name.

As a last-minute rush to get in as much rubber as possible from California, a committee consisting of T. H. WALLACE, of Western Gulf Oil Co. at Bakersfield; S. H. STARK, of Honolulu Oil Corp., at Taft; J. T. McCOLLUM, of the Coalinga Record Oil Co. at Coalinga; F. E. MINSHALL, of Continental, and others has been appointed to make a roundup.

Shifts: ROY D. McANINCH, geologist, Anderson-Prichard Oil Corp., Wichita Falls, Tex., to Oklahoma City, Okla.; W. F. McCORMACK, engineer, Standard Oil Co. of Texas, El Paso, Tex., to Albuquerque, N. M.; CRAIG FERRIS, geologist, Mott-Smith Corp., Wichita, Kans., to Canadian Geophysical Co., Ltd., Swift Current, Sask., Canada; C. D. WATSON, engineer, Carter Oil Co., Tulsa, to Washington, D. C.; F. D. TABBERT, engineer, Shell Oil Co., Inc., Tulsa, to Orlando, Okla.; J. F. REDMOND, engineer, Shell Oil Co., Inc., Tulsa, to Houston, Tex.

RALPH C. LORING has returned to the United States from Ecuador where he was engaged in gravity-meter work for International Petroleum Co., Ltd. He is now at his home in Pasadena, Calif.

S. W. DARLING, superintendent of Texas Co. refinery at Houston, Tex., has been transferred to the company refinery at Bayonne, N. J., as superintendent. O. M. WEBB succeeds Mr. Darling at Houston.

ARTHUR L. ELLIOTT, European representative for Standard Vacuum Oil Co., arrived in the United States via trans-Atlantic clipper last week and will remain a month before returning to London.

W. A. WATERS has returned to Tulsa, after spending 6 years with Standard Oil Co. of Venezuela, in the oil camp at Caripito. He was materials man, and returned to the United States by airplane.

J. T. STEUART, assistant to the president of the Independent Petroleum Association of America, has been in a Washington, D. C., hospital for several weeks. He has undergone a major operation, and expects another soon.

WALTER ZIEGLER, production superintendent and vice president of Ryan Consolidated Petroleum Co., Dallas, Tex., has recently completed a tour of the company's producing properties in Kansas and Oklahoma.

L. S. MELZER, scout for Stanolind Oil & Gas Co., has arrived at the Amarillo, Tex., offices of the company and has assumed his new duties. He was transferred to Amarillo from the Wichita Falls, Tex., office to take the place made vacant when JOE LILLY joined the Air Corps of the Navy.

Do You Remember?

From The Oil and Gas Journal Files

35 YEARS AGO

During June 85 wells were completed in the Gulf Coast region, as against 54 in May. On June 30, 102 wells were drilling, as against 106 on May 31. Of the wells completed in June, 57 were producers, 28 were dry, 3 were gassers, and 30 were abandoned.

John D. Rockefeller appeared in the United States Court at Chicago on July 6 and testified as to the profits of the Standard Oil Co. of New Jersey. Mr. Rockefeller said that his position as president of the company was purely honorary.

The Galbreath Oil & Gas Co. has let contracts for the construction of 14 steel tanks of the capacity of 55,000 bbl. each. The tanks are being erected in the Glenn field, in Oklahoma.

25 YEARS AGO

On July 5 the first oil to reach Wichita, Kans., by pipe line, from Butler County, Kansas, was driven through the Western Refining Co.'s new pipe line.

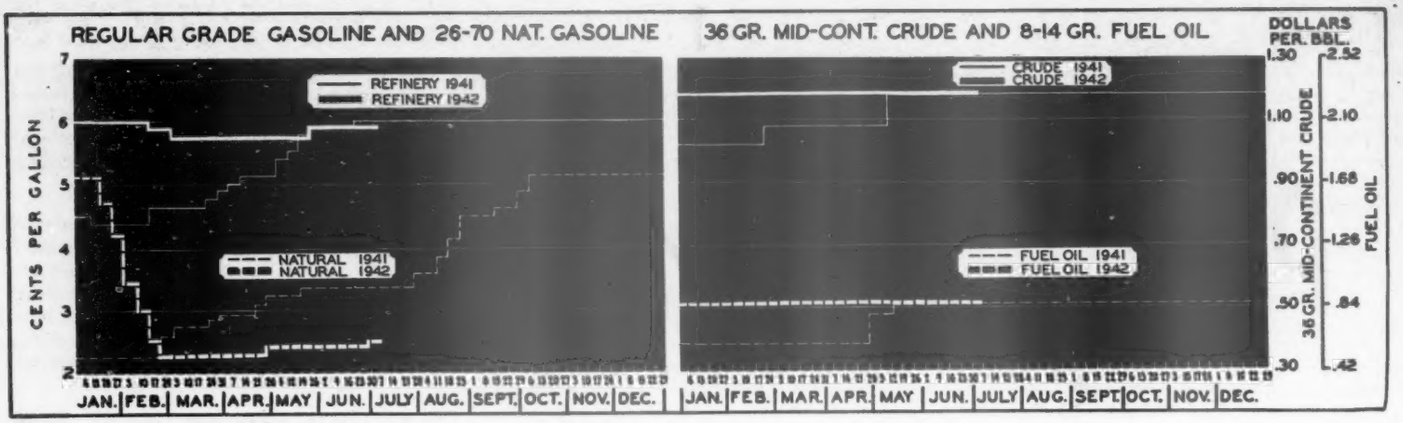
Billings, Okla., is in the limelight of late because of the striking of a 1,200-bbl. well by Mid-Co. Oil Co. on the Brumfield farm, near a well that attracted much attention a few months ago.

At Sandusky, Ohio, the local gas company has notified its patrons that industrial plants, apartments, and hotels must burn coal for fuel next winter. The service will be turned off October 31. Domestic consumers will be supplied.

10 YEARS AGO

For the time being, until East Texas is behind us, the industry's big job will be to keep production within bounds. Coming on the heels of Seminole, Kettleman Hills, and Oklahoma City, the East Texas field created the impression of unfailing abundance.

National guardsmen are patrolling the Oklahoma City field and are keeping a complete check on every barrel of oil produced and transported. It is believed the presence of troops has halted the alleged illicit movement of crude.



MARKET DEVELOPMENTS . . .

East Coast

NEW YORK.—Demands of East Coast motorists for gasoline continued so great despite the 2.5-cent increase in price that went into effect last week that available supplies were far from sufficient. Service stations, particularly those in metropolitan areas, exhausted gasoline stocks within a few hours after they were supplied. The failure of demand to decline in spite of the price increase was viewed as ample justification for the contention that the consumers would willingly absorb their share of the increased cost of supplying this area.

The shortage caused some unusual situations. Lines of cars, some several blocks in length, form at service stations which have supplies. Gasoline trucks almost invariably pick up an escort of cars which follow the tank wagons until they stop so that drivers get some of the gasoline before it is gone.

Last week's price increases were sufficient to meet the extra transportation costs but whether further advances will be allowed to offset other extraordinary costs such as those resulting from changes in yields is uncertain.

Strong demand for lubricating oil is reported from the Pennsylvania area. Demand is particularly heavy for bright stock to be used in blending aviation oils of S.A.E. 50 grade and higher which are being used both for planes and for tanks which are equipped with aviation engines. Demand for gasoline and fuel oil in the western Pennsylvania area also exceeds available supplies but a marked decline for the former may result if rationing is extended to the Ohio line as has been projected.

Mid-Continent

SLIGHTLY higher prices instituted several days ago on the low side of the Mid-Continent appeared this week to be well supported by most refiners. Natural-gasoline manufacturers responded to the general improvement in tone of the motor-fuel market and elevated their range of price quotations 0.125 cent per gallon, both in North Texas and the Group 3 territory.

Top quotations for regular-grade gasoline in the Mid-Continent tank-car market rested at 5.875 cents per gallon. Buyers reported that no material, meeting standard specifications, was available for less than 5.75 cents.

Natural-gasoline quotations, in the Oklahoma-Kansas manufacturing area, were raised to 2.5 cents and North Texas operators raised their prices to spot customers to 2.125 cents. Both quotations apply to 26-70 material.

The demand continues brisk for kerosene, tractor fuels and all grades of burning oils. Much of the current interest in medium weight and residual fuels is for immediate consumption in war industries now moving into maximum production operations throughout the Middle West and Atlantic seaboard states. Prices on most burning products are static at the ceiling levels.

Eastern buyers are seeking additional refinery products from Mid-Continent suppliers for overland shipment by tank cars. Considerable pressure is being exerted on Mid-Continent and Middle West tank-car shippers aimed at more extensive diversion of rolling equipment but refiners and natural-gasoline manufacturers contend they have curtailed their requirements for rail road facilities to an irreducible minimum.

SENTENCE SUMMARIES

MID-CONTINENT: Fractional advances on refinery motor fuel and natural gasoline gain full support of manufacturers.

EAST COAST: Demand continues in excess of authorized gasoline supply. Higher prices no deterrent.

GULF COAST: Few cargoes reported moving in coastwise convoys. Selling pressure on motor fuel reduced to some extent. Fuels firm and scarce.

PENNSYLVANIA: Demand for bright stocks continues upward. Supplies of gasoline and fuel oils short of requirements.

PACIFIC COAST: Light burning oils soften slightly. Residual demand continues firm, increase in requirements anticipated.

A.P.I. REFINERY REPORT

Week Ended June 27, 1942

(Figures in thousands of barrels)

	Dly. crude runs to stills	Stocks Gasoline	Residual	Gas oil
Appalachian	164	3,067	513	576
Ind., Ill., Ky.	743	16,857	3,265	3,534
Okla., Kans., Mo.	370	8,107	1,542	1,337
Censored area*	1,559	41,567	15,272	16,602
Rockies	93	2,415	546	325
California	652	16,598	54,836	11,807
Total June 27, 1942	3,581	88,611	77,304	32,851
Total June 20, 1942	3,434	89,847	78,318	32,244
Total June 28, 1941	3,949	90,414	91,296	37,832

Note: Refinery runs and stocks for week ended July 4, 1942, appear on Trends page.

*Reports combined on East Coast, Gulf Coast, Louisiana-Arkansas and Inland Texas at request of OPC.

CRUDE-OIL STOCKS

(Bureau of Mines estimate)

Week ended:	Bbl. of crude*
June 27, 1942	253,364,000
June 20, 1942	252,748,000
June 28, 1941	259,399,000

*Excludes heavy, unrefinable stocks in California.

Tank trucks now are permitted greater freedom in loading and discharging at pipe line and railroad terminals than at any time in the previous history of petroleum distribution, tending to minimize the requirements for tank cars at hundreds of interior consuming centers.

Gulf Coast

HOUSTON, Tex.—The recent advance in gasoline prices in eastern states has strengthened the motor-fuel market in the Gulf Coast area and a more optimistic feeling prevails among market observers. House-brand 72-74 gasoline which had been quoted for the past several months at 4.75 cents is now reported strong at 5 to 5.625 cents. In the meantime, there were reports that sales on the open market had been made for lifting by tankers. This is the first tanker movement other than lend-lease sales to be reported in several months although this has been indicated by the improvement in the stock situation which could not have been steadied otherwise by limited tank-car and barge movement.

Although not confirmed in the Gulf Coast area, it is reported that the joint barge committee which was authorized by OPC to make a survey of the situation in an attempt to increase movement, has recommended that companies discontinue barging oil and refined products from the Louisiana district to Texas. Such a move, it was said, would allow an increase in barge shipments North and East. It is estimated that more than 80,000 bbl. of crude and refined products is being barged daily from Louisiana to Texas.

Pacific Coast

LOS ANGELES, Calif. — Gasoline is slightly firmer but prices are unchanged. Declines in demand for diesel and gas oil has resulted in softer market undertone but the market level is being maintained. There is no indication that diesel or gas oil will go to lower prices for the present.

Fuel oil continues to be the one bright spot in Pacific Coast refined-oil markets although gasoline consumption should be stepped up slightly with the advent of summer and this usually occurs after and over the July 4 holiday period. Fuel-oil demand is expected to reach substantially higher ground within the next few months and if the Axis makes important inroads in crude-oil production in the Near East, California may be obliged to step up shipments. California marketers do not believe they could move any considerable quantity from the West Coast. The Atlantic area would have to be supplied by the Gulf Coast even though it might be safer to move oil via the Pacific route.

REFINERY AND TANK-WAGON PRICES

(Prices as of July 7)

Refinery Gasoline

Octane (A.S.T.M.):	†80	78	74-76	72-74	68-70	63-66	60 & lower
Mid-Continent*	.....	.....	.....	5.625-5.750	.....	5.250-5.375	4.875-5.000
Pennsylvania	.....	.....	6.750-7.000	.....	.....	.....	.....
Gulf Coast‡	6.00-6.50	.....	.....	§5.750-6.250	§5.750-6.250	§5.250-5.750	§5.000-5.500
Northeast Coast	12.200	.....	.....	11.700	11.700	.....	.....
Pacific Coast	.....	6.500-6.750	6.125-6.250	6.250-6.500	5.750-6.250	5.25-5.50	4750-5.000

*Basis Group 3. †1939 C.F.R. (research method). ‡Integrated companies restricted to lowest prices. §Unleaded.

Quotations are f.o.b. plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon on lubricating oils, and do not include marine lighterage charges.

Natural Gasoline

Grades:	26-70	18-55	75-85(350-375)
Oklahoma (Group 3)	2.500	3.000	.....
North Texas	2.125	2.500	.....
North Louisiana	2.250	2.625	.....
California	.....	.....	5.000-5.500

Kerosene and No. 1 Fuel Oil

Gravity:	46	45	42-44	41-43	38-40
Mid-Continent*	.....	.....	4.500-4.750	4.375-4.625	.....
North Louisiana	.....	.....	.....	4.500-4.750	.....
Pennsylvania	6.250	6.125-6.250	.....	.....	.....
California	.....	.....	.....	4.500-6.000	4.500
Northeast Coast	.....	.....	.....	7.700	.....
Gulf Coast	.....	.....	.....	3.875	.....

*Basis Oklahoma Group 3.

Tractor, Diesel, and Bunker Fuel Oil

Specifications:	46-48° G.	24 D.I.	48-52 D.I.	58 & above	Diesel bunkers	Bunker C
Mid-Continent*	4.125	.....	.....	.....	.....	.....
California	.....	2.750-4.000	.....	.....	‡$1.35-1.45	$0.85-0.90
Gulf Coast	.....	.....	4.000	4.125	1.45	0.85
Northeast Coast	.....	.....	.....	7.800	2.222	1.80
North Louisiana	.....	.....	.....	.....	.....	†0.80-0.85

*Basis Oklahoma Group 3. †10-14° gravity. ‡Pacific Specification 200.

Furnace Oil, Gas Oil, Fuel Oil

	No. 2	No. 3	No. 5	No. 6
Mid-Continent*	3.500-3.625	3.375-3.500	$0.85	$0.85
Pennsylvania (West)	5.625-5.875	5.375-5.875	†5.250-5.500	.....
Northeast Coast	7.8	7.8	1.85	1.80
Pacific Coast	5.5	5.5	‡0.80-95	§0.80
Gulf Coast	3.875-4.0	.....	1.65	0.85

*Basis Oklahoma Group 3. †36-40 gravity fuel oil. ‡Pacific Specification 300. §Pacific Specification 400.

Lubricating Oils

Bright and Steam Refined

OKLAHOMA (Group 3)—

200-210 D, 10-25	.....	27.00
150-160 D, 0-10	.....	23.00
120-125 D, 0-10	.....	22.90
Steam refined:		
600 dark green (untreated)	9.00	9.50

PENNSYLVANIA—

Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash):		
10 pour point	.....	30.50
15 pour point	.....	29.50
25 pour point	25.00	28.00
Steam refined:		
600	15.00	16.00
650	15.50	16.50
600 flash	16.00	17.50
630 flash	17.00	17.50

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—

0-10 pour point:	
200-3	15.00
300-3	18.00
500-3	19.50
600-3	20.00

Note: Viscous neutrals, 10-25 pour, quoted 0.5 cent under 0-10 oils.

Neutral Oil

CALIFORNIA

Pale oils:		
200-2½-3	7.00	7.75
400-3-4	7.25	8.00
600-3-4	8.75	11.00
Red oils:		
200-4-5	7.00	7.75
400-5-6	9.00	11.00
500-900, 5-6½	9.25	11.25

GULF COAST—

Pale oils:		
200-3	8.50	8.75
300-3	9.00	9.25
500-3½	9.75	10.00
750-3½	10.00	10.25
2,000-4	10.50	10.75
3,000-4	12.25	12.50

PENNSYLVANIA—

150 vis. at 70° F., 3 color, 400-405 flash:	
Zero pour point	38.50
10 pour point	37.50
15 pour point	36.50
25 pour point	31.00
200 vis. at 70° F., 3 color:	
Zero pour point	40.50
10 pour point	39.50
15 pour point	38.50
25 pour point	33.00

Wax

(Cents per pound)

OKLAHOMA (Group 3)—	
124-126 (A.m.p.) w.c. scale	4.350-4.550
PENNSYLVANIA (inland refineries)—	
122-124 (A.m.p.) w.c. scale	4.250
124-126 (A.m.p.) w.c. scale	4.250

NEW YORK—

Wax in bags fully refined:

130-132 (A.m.p.) wax	6.250
133-135 (A.m.p.) wax	6.550
Crude scale:	
124-126 (A.m.p.) w.s.	4.350-4.455
124-126 (A.m.p.) y.s.	4.350-4.455

EXPORT PRICES

Gasoline—60-62° Gravity, Maximum 400 End Point

Octane:	72-74	68-70	65-66	60
Gulf Coast	6.500	6.250-6.500	5.875	5.625
Pacific Coast	.....	6.125-6.500	5.875-6.000	5.500-5.625

Distillate and Fuel Oil

	Kerosene	Diesel fuel				Bunker
	41-43	24 G.	48-52 D.I.	58 D.I.	Bunkers	C grade
Gulf Coast	4.000-4.250	.....	4.125-4.375	4.375	$1.65-80	$0.85-95
Pacific Coast	4.750-5.000	1.25-30	.....	.....	†1.35-45	*0.80-90

*Pacific Specification 400. †Pacific Specification 200.

Lubricating Oils

	Neutral oils		Bright and cylinder stocks		
	200-3	150-3	200-3	150-3	600&630 S.R.
Mid-Continent	16.8	.....	28.8	24.8	.....
Pennsylvania	43-50	41-46	36-37	36-37	26.5-27

GASOLINE AND KEROSENE TANK-WAGON PRICES IN 50 CITIES

(Gasoline prices based on regular grades, tax included, undivided dealer)

ATLANTIC AND NEW ENGLAND

(Socony-Vacuum Oil Co., Inc., and Atlantic Refining Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Baltimore, Md.	17.55	5.50	11.10
Boston, Mass.	17.00	4.50	10.40
Burlington, Vt.	19.00	5.50	...
Buffalo, N. Y.	18.30	5.50	11.20
Dover, Del.	18.80	5.50	12.80
Hartford Conn.	17.70	4.50	...
Manchester, N. H.	19.40	5.50	11.40
Newark, N. J.	16.80	4.50	10.30
New York, N. Y.	18.20	5.50	10.40
Philadelphia, Pa.	18.30	5.50	12.55
Pittsburgh, Pa.	18.80	5.50	12.90
Portland, Me.	18.40	5.50	10.50
Providence, R. I.	17.10	4.50	10.20
Washington, D. C.	16.80	3.50	11.60
Average 14 cities	18.01	5.07	11.28

(All prices undivided dealer basis.)

CENTRAL

(Standard Oil Co. of Indiana, Standard Oil Co. of Ohio, Continental Oil Co. and Texas Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Chicago, Ill.	14.10	4.50	10.30
Cleveland, Ohio	15.00	5.50	*9.00
Dallas, Tex.	13.00	5.50	7.00
Des Moines, Iowa	11.90	4.50	9.80
Detroit, Mich.	14.40	4.50	9.60
Fargo, N. D.	16.90	5.50	11.30
Huron, S. D.	16.30	5.50	10.70
Indianapolis, Ind.	15.20	5.50	9.80
Little Rock, Ark.	17.50	8.00	10.00
Milwaukee, Wis.	16.10	5.50	10.50
Minneapolis, Minn.	15.40	5.50	10.30
Omaha, Neb.	15.40	6.50	9.80
Tulsa, Okla.	16.50	7.00	8.50
Wichita, Kans.	12.70	4.50	8.00
Average 14 cities	15.03	5.57	9.61

*Includes 1-cent state tax.

SOUTHEASTERN

(Standard Oil Companies of New Jersey, Kentucky, and Louisiana)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Atlanta, Ga.	21.50	7.50	11.40
Birmingham, Ala.	23.10	8.50	11.00
Charleston, S. C.	21.05	7.50	...
Charleston, W. Va.	21.35	6.50	11.90
Charlotte, N. C.	22.20	7.50	11.90
Jacksonville, Fla.	21.50	8.50	10.40
Jackson, Miss.	18.00	7.50	8.50
Louisville, Ky.	17.00	6.50	8.50
Memphis, Tenn.	17.75	8.50	10.50
New Orleans, La.	17.25	8.50	*10.00
Norfolk, Va.	19.45	6.50	12.60
Average 11 cities	19.92	7.59	10.67

*Includes 1-cent state tax.

MIDWESTERN

(Continental Oil Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Albuquerque, N. M.	17.50	7.50	10.00
Boise, Idaho	20.10	6.50	16.50
Casper, Wyo.	17.00	5.50	12.00
Denver, Colo.	14.50	5.50	11.00
Helena, Mont.	17.00	6.50	13.00
Phoenix, Ariz.	18.50	6.50	12.50
Reno, Nev.	17.50	5.50	13.50
Salt Lake, Utah	18.50	6.50	14.50
Average 8 cities	17.58	6.25	12.88

PACIFIC COAST

(Standard Oil Co. of California)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Portland, Ore.	17.00	6.50	13.50
San Francisco, Calif.	14.50	4.50	11.50
Seattle, Wash.	17.00	6.50	13.50
Average 3 cities	16.17	5.83	12.83
Average 50 cities	17.42	5.96	11.02
Average last week	17.42	5.96	10.30

Appalachian Fields

(Continued from Page 62)

Co. 3 W. H. Davis, 109,000 cu. ft. gas, Injun sand, T.D. 2,025 ft.

Taylor County, Booth Creeks district: Pittsburgh & West Virginia 6129 D. Bruce Mason, 100,000 cu. ft. gas, Big Injun sand, T.D. 1,093 ft.

Tyler County, Ellsworth district: Hope 3733 Wm. Ferrell, 2 bbl. and 10,000 cu. ft. gas, Keener sand, T.D. 1,797 ft.

Meade district: Neeley Oil & Gas 1 Oscar Martin, 231,000 cu. ft. gas, Keener sand, R.P. 125 lb., T.D. 1,717 ft.

Upshur County, Banks district: Cumberland & Allegheny Gas Co. 322 P. A. Darnell, 375,000 cu. ft. gas, Squaw sand 1,632-84 ft., gas 1,648 ft., T.D. 2,463 ft.

ORISKANY GAS FIELDS

Jackson County, Ripley district: Columbian Carbon Co. 1 C. A. Parrish, 12,680,000 cu. ft. gas, Oriskany 4,969 ft., R.P. 1,710 lb., T.D. 4,984 ft.

Columbian Carbon Co. 2 R. A. Shinn, 8,421,000 cu. ft. gas, Oriskany 4,960-5,005 ft., gas 4,969-90 ft., R.P. 1,700 lb., T.D. 5,007 ft.

Spartan Gas Co. 1 Francis Parsons Martin, 9,005,000 cu. ft. gas, Oriskany 5,037 ft., gas 5,038-47 ft., T.D. 5,047 ft.

United Fuel Gas Co. 1 N. M. Carney, 3,858,000 cu. ft. gas, Oriskany 4,975 ft., shot 5,077-97 ft., T.D. 5,012 ft.

Kanawha County, Poca district: Godfrey L. Cabot, Inc. 1 R. Roxie Pritt, 660,000 cu. ft. gas, Oriskany 4,866 ft., shot 4,866-89 ft., T.D. 4,946 ft.

Godfrey L. Cabot, Inc. 9 D. H. Morton, 1,279,000 cu. ft. gas, Corniferous 4,919 ft., Oriskany 5,012 ft., shot 5,013-33 ft., T.D. 5,087 ft.

United Fuel Gas Co. 5061 Leatha Summers, 5,955,000 cu. ft. gas, Corniferous 5,158 ft., Oriskany 5,289 ft., R.P. 900 lb., T.D. 5,309 ft.

Crude-Oil Prices

Republic Oil Refining Co., Houston, Tex., posted new prices for the light crudes (5,800-ft. sand or lower) in the Plymouth field and (6,000-ft. sand or lower(in the Midway field. Both crudes are posted at $1.25, effective July 1.

Representative selected crude prices from all sections of the country appear below:

East Texas	$1.25
Conroe	1.43
Tepetate, Louisiana	1.18
Smackover, Arkansas, heavy	.83
Illinois basin	1.37
Pecos County, Texas	.95
Lance Creek, Wyoming	1.12
Bradford, Pennsylvania	3.00

Gravity Schedules

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast, Texas	West Texas*
18-18.9	$0.80	...	...	...
19-19.9	.84	...	$1.06	$0.70
20-20.9	.88	$0.85	1.08	.72
21-21.9	.92	.87	1.10	.74
22-22.9	.96	.89	1.12	.76
23-23.9	1.00	.91	1.14	.78
24-24.9	1.03	.93	1.16	.80
25-25.9	1.07	.95	1.18	.82
26-26.9	1.11	.97	1.20	.84
27-27.9	1.15	.99	1.22	.86
28-28.9	1.18	1.01	1.24	.88
29-29.9	1.20	1.03	1.26	.90
30-30.9	1.23	1.05	1.28	.92
31-31.9	...	1.07	1.30	.94
32-32.9	...	1.09	1.32	.96
33-33.9	...	1.11	1.34	.98
34-34.9	...	1.13	1.36	1.00
35-35.9	...	1.15	1.38	1.02
36-36.9	...	1.17	1.40	1.04
37-37.9	...	1.19	1.42	1.06
38-38.9	...	1.21	1.44	1.08
39-39.9	...	1.23	1.46	1.10
40 and above	...	1.25	1.48	1.12

*Includes Lea County, New Mexico.

EQUIPMENT PROGRESS...

Union Wire Rope Corp. Receives Naval "E"

Union Wire Rope Corp., Kansas City, Mo., is the newest member of the industry to be awarded the Naval "E" for Excellence in recognition of outstanding service to the war effort. The official presentation of the blue burgee was made in a ceremony at the Kansas City plant on Wednesday, July 8.

Rear Admiral W. C. Watts presented the blue banner to M. G. Ensinger, president of the corporation. John Haglein, oldest employe of the company, accepted the "E" buttons for other employes.

Business leaders of the Kansas City area and a large delegation of Navy and Army officers were among the hundreds present. Distinguished guests included Capt. S. C. Loomis, inspector of naval materials for the Ninth Naval District; Comdr. D. W. Tomlinson; Mayor John B. Gage of Kansas City; Gov. Payne Ratner of Kansas; Dwight H. Brown, secretary of state for Missouri; R. H. Bartlett, chairman of the board of Union Wire Rope Corp.; E. H. Reedy, and Phil D. Morelock, board members.

The Third Regiment band, American Legion color guards and the fife and drum corps of the Northeast Youth Club added color to the occasion. Later in the day a cocktail party and banquet were given by the Chamber of Commerce in honor of Union Wire Rope officials and visitors.

Universal Adoption of A.W.H.E.M. Standards Is Expected

By use of the Association of Well Head Equipment Manufacturers standards, which are expected to be universally adopted by manufacturers and users, economies and simplifications have resulted. Greater flexibility in use of these standards also has helped to effect suitable equipment. The standards were studied, formulated, and set up by experienced representatives of oil operators and manufacturers. Considerable analysis, investigation, and experimentation were conducted before final adoption.

For instance, on October 19, 1941, the association adopted terms and definitions of well-head equipment, which heretofore carried a hodge-podge of nomenclature. They are, in the order of their listing, as follows: casing head, tubing head, casing and tubing suspension, pressure sealing mediums, christmas tree, and blowout preventers. The casing head and tubing head are comprised essentially of the body, hanger, sealing medium, bonnet, and connecting means, the latter of which might be either flanged or threaded connections.

The code of recommended practices of pressure-testing certification, describing the proper use and significance of the monogram and seal, was adopted February 17, 1942.

The monogram and seal on well-head equipment, already being used at present, is a guarantee of the manufacturer to the consumer that the material bearing the mark meets the A.W.H.E.M. specifications. The manufacturer is licensed to use the monogram or seal by filing a sworn statement that the material on which the monogram or seal is used meets the adopted specifications.

Further making them more important, the monogram or seal can be used only on materials which have been covered by A.W.H.E.M. specifications and then only in accord with the stipulations contained in the governing specifications under which authority to use the symbol has been granted.

Under the code of recommended practices on pressure testing and certification, the scope of the specification covers all materials defined in the terms and definitions of the standardization committee.

This latter specification is designed to cover minimum requirements and materials of equal or superior properties that may be substituted. For the time being, no chemical or physical properties are given, but the suggestion is made that specifications of the American Society for Testing Materials be used tentatively. (1) Cast iron to be in accordance with specification A-126. (2) Cast steel to be in accordance with Specification A-95. (3) Forged steel to be in accordance with Specification A-105.

The materials covered by the certification are included in four groups, the first being steel castings used for working pressures of 1,500 lb. per sq. in. and over, and forgings used for working pressures 1,500 lb. per sq. in and over. Under Group 2 are included steel castings for working pressures from 500 lb. per sq. in. to 1,500 lb. per sq. in., and forgings used for working pressures from 500 to 1,500 lb. per sq. in.

Under Group 3, materials include steel castings or forgings used for working pressures from zero to 500 lb. per sq. in. Group 4 includes iron castings for working pressures from zero to 500 lb. per sq. in.

Under conditions of testing, the association established minimum requirements, the first of which is that the test rack and testing procedure are to be open to inspection to either the customer or association representative. Records are to be kept of each testing, with competent men to be in charge of testing. Another specification calls for test gages to be calibrated frequently and record of calibration to be filed.

In testing, the testing pressure in general will equal two times the working pressure. A hydrostatic test with cold water is recommended as a testing fluid.

The association has purnished free copies of the standards and ideals to all purchasing agents, field superintendents, foremen, drillers, and others concerned with the purchasing or specifying of well-head equipment.

The association maintains offices at Houston, Tex. Firms authorized to use A.W.H.E.M. symbols so far are:

Beaumont Iron Works, Beaumont, Tex.; Brown Oil Tools, Inc., Cameron Iron Works, both of Houston, Tex.; Hinderliter Tool Co., Tulsa; McEvoy Co. and Oil Center Tool Co., both of Houston, Tex., and Rector Well Equipment Co., Jnc., Fort Worth, Tex.

TRADE LITERATURE

WARNER LEWIS CO., Tulsa—Bulletin 103 covering Saran, the plastic tubing for use in instrument control lines, electrical insulation, or for gasoline, lube oil, natural gas, acid, or refrigerant lines.

B. F. GOODRICH CO., Akron, Ohio.—New catalog section on Vulcalock rubber linings for handling corrosives and abrasives. Includes a table listing over 100 of the most common services for which the product is suitable and giving the limits of temperature and concentration of the fluid in each.

JOHNS-MANVILLE, 22 East Tenth St., New York.—Operating-practice manual, designed to help get maximum production from equipment and eliminate unnecessary shutdowns. The manual gives many practical suggestions on getting better service from maintenance materials. It is called "100 Suggestions for Good Operating Practice," and outlines in tabular form many hints on lengthening the life of packings, insulations, roofings, friction materials and refractory products.

MEXICO REFRACTORIES CO., Mexico, Mo.—Brochure entitled "Selection of Refractories to Meet Specific Service Conditions." While not designed as a sales manual, the brochure, which was prepared by the firm's engineering division in collaboration with the advertising department, should be of interest to men in the industry who are striving to achieve the ultimate in production to best further the war effort.

Foxboro Offers Hyper-Reset For Fast Stabilizing Control

A new development in the field of control engineering has been announced by Foxboro Co. under the name of Hyper-Reset. This is not an instrument or a

mechanism, but a control function, available in the newly designed Model 30 Stabilog Controller, for application where process lag is considerable. Its importance is demonstrated by tests in which Hyper-Reset consistently reestablished process stabilization, following an upset, in one-quarter of the time, and with only one-half the upset effect, as compared with a similar controller having only the usual reset.

Hyper-Reset reduces the effects of a process disturbance by making initial temporary additional corrections, which are proportional to the rates of change of the measured value caused by the disturbance. The normal reset follows, establishing stabilization. But the several control functions carried out by Hyper-Reset are simultaneously and automatically adjusted. No tuning-in is necessary. No more than two process adjustments are required, proportional and Hyper-Reset.

The theory and performance of Hyper-Reset are explained in Bulletin No. A-330. Copies will be sent on request by Foxboro Co., Foxboro, Mass.

U. S. Stoneware Acquires Rubber Goods Plant

Chamberlain Engineering, Ltd., a unit of the United States Stoneware Co., has just purchased the business and mechanical rubber goods factory of the Lower Rubber Manufacturing Co. at Ravenna, Ohio. The plant was built in 1938 and its equipment, therefore, is thoroughly modern.

This new Lower plant will be used principally for milling, calendering, extruding and molding operations on the "Tygon" series of synthetic-rubber-like materials. Provision will also be made for the production of U. S. Stoneware's "Duralon," the synthetic resin with a polymerized furfural orthosilicate base, as a substitute for hard rubber in all extruded and molded shapes.

The old and varied mechanical-rubber-goods line of the former Lower company will be retained. Many new rubber items will also be produced for the Chemical Warfare Service and other war agencies.

The technical facilities and sales organizations of the two companies will be merged. M. S. Lower, former president of the Lower Rubber Manufacturing Co., will serve as general manager of the plant, which will be operated as the Lower Rubber Manufacturing Division.

Twin Disc Moves Hydraulic Division to Rockford

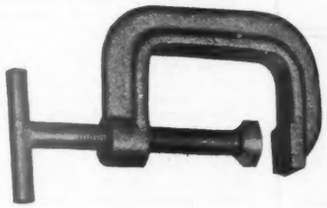
New machines and new facilities are now being installed in Twin Disc Clutch Co.'s plant at 1310 Preston Street, Rockford, Ill. The expansion results from the creation of a separate division of Twin Disc Clutch Co. to handle the development, production and sale of hydraulic drives and torque converters, formerly a department of the company's operations at Racine, Wis.

R. M. Schaefer has been named vice president in charge of the Hydraulic Division of Twin Disc Clutch Co., all of the activities of which now will be concentrated in Rockford. The products to be manufactured involve fluid-type transmissions, which are finding ever-increasing applications in many industrial fields. This development has been carried on extensively by the company for the last 5 years. A considerable number of these units, which were previously produced in Racine, are now in service in a wide variety of equipment operating throughout the United States as well as in South America and Canada. Further engineering research and development will be carried on by the staff of Twin Disc engineers recently transferred from the Racine plant to the laboratories now made available in the Rockford plant.

P. H. Batten, one of the men who originally organized the Twin Disc Clutch Co. in 1918, is extremely active as the president of the company in Racine. Assisting Mr. Schaefer in Rockford will be R. P. Exten, plant manager; J. R. Murphy, purchasing agent, and R. T. Rehwald, assistant secretary of the company.

Heavy-Duty Nonskid Clamp By Patterson-Ballagh Corp.

A different type of C-clamp with nonskid features has been designed by Patterson-Ballagh Corp., 1900 E. Sixty-fifth Street, Los Angeles, Calif., which prevents skidding when tightening. The clamp tip is equipped with a bronze bushing in which the end of



the screw rotates. The screw is made of heat-treated steel. This bushing prevents galling and provides a free movement so that slippage on the work is prevented. The frame is made of cast steel, also made with terminal lug for use on grounding cable during arc welding. A welded T-shaped wrench handle allows a firm grip.

Worthington Pump Corp. Receives Navy "E"

Ninety-five years of uninterrupted service to the U. S. Navy by the Worthington Pump & Machinery Corp. reached a new milestone on June 26, when the highly prized Navy "E" pennant, for excellence in production, was awarded to the company at Worthington's main plant at Harrison, N. J. Rear Admiral Henry A. Wiley, U.S.N. (retired) made the presentation, which was accepted by Hobart C. Ramsey, vice president in charge of operations, on behalf of the Harrison plant employes.

Furnishing equipment to the Navy is an old story with the Worthington company. As far back as 1847 a direct-acting steam-driven reciprocal pump, invented 7 years previously by Henry E. Worthington, was installed on the U.S.S. Powhatan and from that small beginning Worthington developed a service to the Navy that has grown in scope and importance through three generations. Many Civil War gunboats were Worthington equipped and the company's pumps and other products were thoroughly tested during the Spanish-American War. Of the 231 destroyers built during the first World War, each was equipped with Worthington pumps and torpedo charging compressors. The renowned 50 "four-stacker" destroyers assigned to the British Navy by President Roosevelt were among these.

AMONG EQUIPMENT MEN

Executives Survey Extensive Plant Expansion Program

To personally survey the extensive plant expansion now completed by the Pacific Pump Works, Pacific executives and executives of the affiliated eastern companies met in Los Angeles June 22, 1942. In this group were J. B. O'Connor, vice president of Clark Brothers Co. and chairman of the board of directors of Pacific Pump Works; C. P. Clark, president of Clark Brothers and vice president of Dresser Corp.; A. R. Weis, president of Pacific Pump Works, and Elmer Weis, vice president of the Pacific organization. Pacific Pump Works and Clark Brothers Co. are affiliates of Dresser Corp., as is the Bryant Heater Co. of Cleveland.

The group spent the balance of the week in the southern California area.

Bristol Appoints C. A. Mabey Director of Research

Bristol Co., Waterbury, Conn., manufacturers of industrial process instruments and automatic-control apparatus, has announced the appointment of Charles A. Mabey as director of the research activities of the company. Mr. Mabey, who has served as physicist for several years in this organization, is a Harvard graduate and did advanced work in physics at both Harvard and M.I.T. He also has been associated in research work with International Communications Laboratories of New York, Federal Telegraph Co. of Newark, N. J., and with Mathieson Alkali Works of New York, and is a member of the American Physical Society.

Booth Named Tulsa Sales Manager Of Spang Chalfant, Inc.

Edwin A. Booth has been appointed manager of sales for the Tulsa office of Spang Chalfant, Inc., succeeding O. A. Bergman, who has resigned. Mr. Booth was formerly located at the St. Louis, Mo., office of the company. The change was effective July 1.

Burns Works Manager of Superior Engine Division

National Supply Co. announces the appointment of T. W. Burns as works manager of the plant of the Superior Engine Division, located at Springfield, Ohio.

Mr. Burns brings to his new position a thorough knowledge of factory methods, systems and production efficiency, gained through many years of experience in shop management. He was long associated with Fairbanks, Morse & Co. in various executive positions. After some 12 years as works manager of their Beloit, Wis., plant, he resigned to accept a similar post with A. O. Smith Corp. of Milwaukee, Wis., where he has been located until his recent appointment with National Supply Co.

Kunzler Field Manager of Elliott's Tube-Cleaner Department

L. A. Kunzler, who has been with the Elliott Co., Jeannette, Pa., since 1935 and has been located in the Tulsa office for the past 4 years, has been made field manager of the tube-cleaner department at Springfield, Ohio. After spending some time at headquarters on development plans for tube cleaners and cutting heads, Mr. Kunzler will devote the greater part of his time to traveling around the country in the interest of tube-cleaner applications in both refineries and industrial power plants.

WINNERS OF NOMADS CLUB GOLF TOURNEY AWARDED STAMPS

Left: I. Frank Brown receives a prize for low gross from Russell Heath, president, New York Chapter of Nomads. Right: W. S. Evans receiving a prize just handed him by Russell Heath. At right is Val Wittich

War savings stamps were awarded the winners at the annual golf party held by the New York chapter of Nomads at Englewood Country Club, Englewood, N. J., May 20. The party was attended by a majority of the members and several guests. Low gross prize for guests was won by Jerry Weeks, Standard Oil Development Co., and low gross prize for members was won by I. Frank Brown, New York export representative. Other prizes were won by Verne Leonard, Shell Oil Co., Inc., and Bill Evans, Lucey Export Co.

CLASSIFIED ADVERTISING

Patent Attorneys

PATENTS — TRADE MARKS

All cases submitted given personal attention.

Form "Evidence of Conception" with instructions for use and "Schedule of Government and Attorney's Fees—FREE.

LANCASTER, ALLWINE & ROMMEL
Patent Law Offices
418 Bowen Bldg., Washington, D. C.

Leases and Drilling Blocks

LEASES—East Texas, La., South Ark. 20 acres up, dollar acre up.—Owners—Address Attorney, Box 1122, Little Rock, Ark.

LEASES ROYALTIES

PRODUCING OR NONPRODUCING
Texas, New Mexico, Oklahoma, Louisiana and Illinois
20 Years' Experience
Inquiries Invited

B. D. BUCKLEY
Paul Brown Bldg., St. Louis, Mo.

CHEAP CRANE COUNTY Sec. 18, B28, under Magnolia-Stanolind leases. Jefferson G. Smith, 215 Littlefield Bldg., Austin, Tex.

SOUTH DAKOTA BASIN: Follow the big boys. Commercial Leases, active counties. Tracts 40 acres up. 8 to 10 years to run, ten cents per acre yearly rental. Opinions of Title furnished, $100.00 per 40. Cheap speculation with merit and possibilities. Also large drilling blocks with favorable geology. Map furnished on each sale. Inquiries solicited. Dakota Oil Exploration Company, Box 436, Pierre, S. D.

FOR SALE: Oil and Gas leases on proven structures, drilling propositions, small production and fluorspar deposits. Reports furnished. W. P. Harley, Bowling Green, Ky.

MICHIGAN—760 acres to lease for Oil and Gas. Map free. Owner Lee J. Meldrum, 8354 Epworth, Detroit, Mich.

FOR SALE
OR
DEVELOPMENT

4 Producing Bartlesville sand 160 acre oil leases. All connected to pipe line. Attractive for flooding.

Oil 33 to 37 Gravity

Will sell reasonable for part cash, balance in oil or join with responsible parties in flooding.

VEEDER SUPPLY & DEVELOPMENT CO.
Cherryvale, Kansas.

FOR SALE: 2500 A. Oil Lease small production. Sands high Cincinnati Anticlinal 250 Ft. Corniferous an opportunity and lower sands untested. Write Bessie Wickens, Scottsville, Ky., R. F. D.

WILL sell interest thousand acres under lease, new field Penna. crude. Analysis run high cylinder content and wax distillate 45%. Inquire, F. S. Armstrong, Youngwood, Pa.

WILL drill proven acreage or drilling block of merit having good geology or seismograph. Please give enough details in first letter to warrant consideration. Write Box 1098, Shawnee, Oklahoma.

—STRUCTURE GOOD GEOLOGY—
2800 acres commercial oil and gas leases for sale, Sub, lease, or drilling agreement located in townships three and four, range fourteen west, Smith County, Kansas. Address P. O. Box 232, Smith Center, Kansas.

Financing

CAPITAL SEEKERS — Interested in raising $25,000 or more for a legitimate project should communicate with AMSTER LEONARD, Fox Theater Bldg., Detroit, Mich.

OUT OF 5000 American financial houses only 223 bought small issues last few years. The 223 names $4.00. JOHN F. MORRIS, Box 5411, Philadelphia.

Royalties

WE MAINTAIN A MARKET FOR REGISTERED DEALERS IN ALL TYPES OF OIL ROYALTIES.

FIRST DEPENDABLE OIL CORP.
522 Fifth Ave., New York, N. Y.

ANDREW J. BARRETT
The Philtower
Tulsa, Oklahoma.

WE BUY & SELL all types of Oil and Gas Royalties. Sales restricted to registered dealers only. Grimes Royalty Co., National Mutual Bldg., Tulsa, Okla.

FOR SALE—Landowner's Royalty under 160 acres leased to Humble Oil & Ref. Co. in Lea County, N. M., 27 pools in the county. Will sell in small interests. HARRY S. WRIGHT, FARMINGTON, NEW MEXICO.

Situations Wanted

REFINERY Technician and Process Supervisor. M.I.T. graduate. 17 years' varied experience. Includes oil, waxes, asphalts, specialties, Chief Chemist, Process development, plant superintendent, management experience. Age 36. Draft status, 3-A. Box B-141, The Oil and Gas Journal, Tulsa, Okla.

MALE SECRETARY — BBA Degree. Draft Deferred. Gregg Shorthand and Excellent Typist. Experience Oil Leasing. Now employed but desires job as Junior Executive with Future. Box B-160, The Oil and Gas Journal, Tulsa, Okla.

GREASE PLANT Manager—With wide experience in manufacturing of all types of greases and lubricating oils. Executive ability. Box B-140, The Oil and Gas Journal, Tulsa, Okla.

OIL ACCOUNTANT—AUDITOR
(Draft Exempt)

Employed as Chief Accountant by Producing Company with several Subsidiaries. Desire Change. Familiar with Federal and State Taxes including income and Excess Profit, Reorganizations (77B) Joint Interest, General Account procedure Production, Pipe Line and Refining Branches. Best references. Age 44, Married. Box B-173, The Oil and Gas Journal, Tulsa, Okla.

Help Wanted

NOTICE TO ADVERTISERS

Advertisers offering positions to workers skilled in critical war industries are requested by the War Manpower Commission to include the following sentence in their advertisement:

"Applications from those now employed in war industries will not be considered."

FLEET SUPERINTENDENT WANTED Major oil producing company has an opening for an Automotive Superintendent. Applicant should be capable of supervising operations and maintenance of oil field automotive equipment, including diesel engines. In replying state age, education, qualifications, experience in detail and status regarding military service to Box B-161, The Oil and Gas Journal, Tulsa, Okla.

WANTED: Experienced refinery operators for pumping, treating, gas plant and still operation. Give age, experience and salary desired. Reply Box B-172, The Oil and Gas Journal, Tulsa, Okla.

Help Wanted

DESIGNERS AND DRAFTSMEN

For Oil Refinery work carrying high priority ratings of A-1-A and A-1-B under

Government Defense Program

Working 56 hours 3 weeks per month and 44 hours one week with time and one-half for work in excess of 40 hours per week.

Must have experience in design of:

Oil Refinery Process Piping,
Concrete and Structural,
Oil Heating Furnaces
Electrical Control
and
Light and Power
Conduit Systems.

Can use several piping squad leaders. Must be thoroughly experienced on piping design and layout.

ARTHUR G. McKEE & COMPANY
Engineers & Contractors
OIL REFINERIES
BLAST FURNACES
STEEL PLANTS
2300 CHESTER AVENUE
CLEVELAND, OHIO

EXCELLENT OPPORTUNITY FOR QUALIFIED GEOPHYSICIST

Large independent integrated company has opening for an experienced petroleum geophysicist with sound geological background and thorough knowledge of Mid-Continent area. The man wanted is of top calibre, capable of actively directing geological and exploration department. He is probably now profitably employed, but alert to an opportunity for immediate betterment and a future limited only by his ability to produce. Applications will be treated with strict confidence.

BOX B-171
THE OIL AND GAS JOURNAL
TULSA, OKLA.

PRODUCTION Superintendent—Experienced in looking after settled production and old leases. Address Box B-170, The Oil and Gas Journal, Tulsa, Okla., giving age, experience and references. A good opportunity for the right man.

Oil Industry Printing

OIL FIELD LEGAL BLANKS
Leases, assignments, releases, township plat books, well records, etc. Request on your letterhead gets free catalog. Olds Press, 215 East Third St., Tulsa, Okla.

Legal Blanks

BURKHART'S legal blanks and general forms serving Mid-Cont. oil field since 1908—Okla. Kans. N. Mex. Tex. Ala. Ark. Fla. Ga. Ill. Ind. Ky. La. Mich. Miss. Mo. Neb. N. Dak. Tenn. Wyo. Free catalog samples on request. Burkhart Ptg. & Sta. Co., 115 S. Cinn., Tulsa, Oklahoma.

Equipment Wanted

WANTED
Large Steel Storage Tanks and Structural Steel Buildings.
GREENSPON'S
National Stock Yards
(St. Clair County), Ill.

WANTED
2—35,000-55,000 bbl. storage tanks.
2—1300' air compressors.
20—25 ton locomotive cranes.
R. C. STANHOPE, INC.
60 E. 42nd St., New York, N. Y.

WANTED—BULK PETROLEUM STORAGE, 10,000 BBLS. TANKS OR LARGER. Box B-120, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Small lubricating plant to dismantle and move. Box B-150, The Oil and Gas Journal, Tulsa, Okla.

WILL PAY CASH
Storage tanks, abandoned pipe lines or wells, gasoline plants, refineries or any material accumulating from the oil fields regardless of location. WILL HANDLE UNLIMITED DEALS.
PLANT and EQUIPMENT PURCHASING CORP.
606 Fountain Sq. Bldg., Cincinnati, Ohio

For Sale—Equipment

FOR SALE: 1 Brauer Steam operated shale shaker, $100. Patridge, Cities Service Oil Co., Bartlesville, Okla.

FOR SALE 38 x 7, 40 x 8, and 10.50 x 24 used tires and tubes. Patridge, Cities Service Oil Co., Bartlesville, Okla.

50,000 FT. 2" Line Pipe, Screw & P. E. Also 3", 4", 6", 8" and other sizes. Large stock of fittings, valves & other material. GILBERT PIPE & SUPPLY, Electra, Tex.

FOR SALE—One 96 foot rotary drilling derrick now standing near Seminole, Oklahoma. Good condition, price $600.00. Inquire Eason Oil Co., Enid, Okla.

FOR SALE: Oil Hill, Kansas 3 Sullivan Improved N Hydraulics only $100.00 ea. 6—3" x 4" GD chain driven power pumps. $50.00 ea. 4—2" Viking Pumps $10.00 ea. 1—CN Sullivan Drill, $250.00. 1—Sullivan 20 drill only $250.00. 5—GD Power Pumps robbed, $50.00 ea. Patridge, Cities Service Oil Co., Bartlesville, Okla.

FOR SALE: 7¼ x 14 Oil Well Power Slush Pump. Melton Machinery & Supply Co., Seminole, Okla.

FOR SALE: One #10 Adams Leaning Wheel Grader, located at Russell, Kansas. Patridge, Cities Service Oil Co., Bartlesville, Okla.

FOR SALE: At Oklahoma City six #1 Smith 4' 6" x 16' Standard Oil and Gas Separators. Patridge, Cities Service Oil Co., Bartlesville, Oklahoma.

USED CASING FOR SALE
5,000' 2" 4½# Tubing & Rods
2,400' 5⅛ 17# Casing
4,000' 6⅝ 24# Casing
1,800' 8¼ 32# Casing
Five wells producing about twelve barrels per day, each equipped with standard rig, gas engine, 2,500' tubing and approximately 4,000' casing.
KEYSTONE PRODUCTION COMPANY
902 Burk Burnett Bldg.
Fort Worth, Texas.

FOR SALE
35 H.P. Superior Gas Engine and 16 foot Band Wheel Power. Condition A-1. The Geo. McGinley Supply Co., Bowling Green, Kentucky.

FOR SALE — OIL STORAGE TANKS
6—31,000 bbl. with breather roofs.
3—31,000 bbl. without roofs.
In first class condition — ready for immediate delivery.
1—Parkersburg SC-11 Pumping Unit, Stroke 5' to 11'.
JOS. GREENSPON'S SON PIPE CORP.
National Stock Yards (St. Clair County), Illinois.

FOR SALE: 2—75 H.P. Fairbanks-Morse Type Y Oil Engines. Patridge, Cities Service Oil Co., Bartlesville, Okla.

Classified advertising rates: First insertion, 35 cents a line; each additional insertion, 25 cents a line, PAYABLE IN ADVANCE. Six words usually make a line. Count as a word each one-letter word and each group of figures. White-space computed at regular line rate. Allow two extra lines for blind ads. Ads of less than three lines not accepted. No formal acknowledgment is made, and proofs cannot be shown in advance of publication.

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3 Lines	$1.05	$1.80	$2.55	$3.30	7 Lines	$2.45	$4.20	$5.95	$7.70
4 Lines	1.40	2.40	3.40	4.40	8 Lines	2.80	4.80	6.80	8.80
5 Lines	1.75	3.00	4.25	5.50	9 Lines	3.15	5.40	7.65	9.90
6 Lines	2.10	3.60	5.10	6.60	10 Lines	3.50	6.00	8.50	11.00

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THE OIL AND GAS JOURNAL

PRESSURE VESSELS—PUMPS—BUBBLE TOWERS—TANKS
VALVES and FITTINGS—HEAT EXCHANGERS—COMPRESSORS

Fully Reconditioned Refinery Equipment All Kinds

Send Us Your Inquiries—No Priorities Required

SONKEN-GALAMBA SUPPLY COMPANY

W. C. Berry or H. J. Galamba
Riverview at Second, Kansas City, Kansas

Robt. W. Duden
2100 S. Union, Tulsa, Oklahoma

ALL OR ANY PART—COMPLETE 2000 BARREL REFINERY

Bubble Tower 5'x52'x⅜" — 21 Trays With Caps Chrome Alloy — 2000 bbl. Pipe Still, 2½" ID x 2 15/16" OD x 20' Tubes Alloy Headers — 8 Heat Exchangers, 255 sq. ft. ea. All New Tubes — Complete Copper Sweetening Unit — New Carload Ethyl Plant — 47 Storage Tanks from 500 to 15000 bbl. cap. — 30 Pumps All Types — Valves — Fittings — Pipe

THE PLAINS OIL & REFINING CORPORATION
GREAT BEND, KANSAS

OIL TRANSPORTS

4 — Diamond T tractors, 10 wheels, good tires. Capacity 77 bbls. each.

SONKEN-GALAMBA SUPPLY CO.
TULSA, OKLAHOMA

FOR SALE: 27½" Ideal Rotary Table, 5 sheave 200 ton Crown Block, 4 sheave 72" traveling block, 8" Ideal enclosed rotary hook. Melton Machinery & Supply Co., Seminole, Okla.

FOR SALE

3—125 HP 350 WP Acme Boilers
3—125 HP 325 WP Broderick Boilers
3—125 HP 250 WP Donavan Boilers
12000 Ft. 4" API Full Hole Drill Pipe
5200 Ft. 4" Acme Full Hole Drill Pipe.
Major Tool & Supply Co., Okla. City, Okla.

FOR SALE: At Oklahoma City, 65, 70, 75 and 85 HP Oil Field Type Boilers, repaired, tested and ready to go. Also large stock of unrepaired boilers. Patridge, Cities Service Oil Company, Bartlesville, Okla.

FOR SALE — 24,000' of ⅝" and 3000' of ¾" Pump Rods. One 87' MIW 157,000 lb. Derrick. One TC20B Oil Well Pump Unit, and misc. pumping equipment. All in first class condition. Dirks Brothers, Tuleta, Bee County, Texas.

FOR SALE: 12 K.W. Portable Light Plant Powered by 35 H.P. International Engine. Melton Supply Co., Seminole, Okla.

FOR SALE: Burrton, Kansas, dismantled 122' Parkersburg Angle Iron Rotary Derrick. Complete with safety top, bull, calf wheel girt, outside framer sills, $700. Patridge, Cities Service Oil Co., Bartlesville, Okla.

7' x 30' STEEL RIVETED Horizontal Storage Tanks. Also towers, vessels, etc. GILBERT PIPE & SUPPLY, Electra, Tex.

DIESEL — GAS — ENGINES
Large selection—All sizes and types. Generator units, marine engines, gasoline engines, auxiliaries—boilers, steam engines, and turbo-generator sets.
Complete information on request.
A. G. SCHOONMAKER COMPANY
48 Church Street New York, N. Y.

JOPLIN Special drilling machine for sale: Good condition, $3,000, half cash. Drilling escrow money $8,000 in bank goes with machine. Going to army, must sell soon. Harold Hardwick, Burnside, Kentucky.

ABSORBERS

2—72" x 30, 15 tray, 75# W.P.
1—72" x 30, 15 tray, 50# W.P.
All Southwestern Engineering Co. Make.
W. S. SMITH, 523 Thompson Bldg.
Tulsa, Okla. Phone 2-5473

FOR SALE: 7¼ x 18 O. W. S. Mud hog slush pump, with 16 groove sheave, new liners and valves. Good condition. Located at Longview, Texas. Superior Oil Corp., Tulsa, Okla.

FOR SALE: 1 Askenia Type Magnetometer #7970, $750.00. Cities Service Oil Co., Bartlesville, Okla.—H. D. Patridge.

FOR SALE: Two 200 H.P. Electric Motors complete with grids and controls Melton Machinery & Supply Co., Seminole, Okla.

FOR SALE

COMPRESSORS

Complete Repressuring or Air Lift Plant for Immediate Delivery.
2—13 & 5½ x 12 Ingersoll-Rand XOB compressors 400# pressure V-belt driven by 120 H.P. Chicago Pneumatic 3-cylinder vertical gas engines.
2—12 & 7 x 10 Chicago Pneumatic 400# pressure vertical compressors direct connected to 120 H.P. 3-cylinder Chicago Pneumatic vertical gas engines complete.
Used very little — excellent condition. Located on original foundation in Louisiana.

EARL E. KNOX COMPANY
Erie, Penna.

FOR SALE
LOCATED AT CHICAGO, ILLINOIS
TANKS:
5—23000 Gallons Horizontal ⅝" Steel, Riveted
8—12000 Gallons Vertical ⅛" Steel, Bolted
8— 8000 Gallons Vertical ⅛" Steel, Welded
4— 1000 Gallons, Open Top, Vertical, ⅛" Steel, Welded.
COMPOUNDING KETTLES:
2—1200 Gallons Vertical with mixers, riveted, ⅛" steel
1— 150 Gallons Vertical, riveted, ⅜" steel.
STEAM JACKETED KETTLES, Open Top, R Riveted, W Welded. Capacities Gallons—154 R—350 R—350 W—450 R—500 W—1000 R—2400 R.
VIKING OIL PUMPS:
1—2" Quadruple Pump with 10 HP AC Motor, Capacity each pump 90 GPM.
1—4" Single Gear Drive with 10 HP AC Motor, Capacity 200 GPM.
4—2" Single Hot Oil Pumps, Belt Drive.
BRAND NEW WESTFALIA OIL PURIFIERS & BENZINE CLARIFIERS. Capacities 75-165-700-1500 GPH.
FITTINGS & VALVES:
75—4" Cast Iron Flanged Tees Fig. 91 —125 lbs. Crane, Stockham, Walworth makes.
100—4" Flanged Milliken All Iron Valves 125 lbs.
50—4" Flanged ACF Iron Valves 150 lbs.
16—4" Flanged Crane U-Bolt Iron Body and all Iron Gate Valves.
CONSUMERS MACHINERY EXCHANGE, INC.
146-152 West Root Street
Chicago, Illinois.

FOR SALE

OIL STORAGE TANKS

IN GOOD CONDITION

2—80,000 Bbl.
1—35,000 Bbl.
1—5,000 Bbl.
1—4,400 Bbl.
3—2,500 Bbl.
1—3,000 Bbl.
1—1,000 Bbl.
1— 600 Bbl.
1— 100 Bbl.
2—1,200 Bbl. Agitators (prac. new)

Address Your Inquiries to

Dulien Steel Prod., Inc.
2280 Woolworth Bldg.
NEW YORK CITY, N. Y.
TELE. CORT. 7-4676

FOR SALE: 6 x 16 Wilson-Snyder Power Slush Pump. Melton Supply Co., Seminole, Okla.

FOR SALE: Wilson-Mogul Drawworks with water cooled brakes and 100 H.P. International Motor. Melton Supply Co., Seminole, Okla.

Steel VALVES!

Cast and Forged Cast Iron Valves
Standard and High Pressure

Every Type Used in an Oil Refinery

All Expertly Reconditioned and GUARANTEED to Perform Like New.

No Delays

Immediate Delivery
YOU SAVE 25%
Over Cost of New Valves

For 8 years, a division of our plant has specialized in reconditioning valves for major oil companies and large industrial plants. Our shops are equipped with the most modern and efficient tools and facilities for rebuilding valves. Every valve has been expertly reground, reseated, repacked and hydrostatically tested. GUARANTEED to give same service as new valves.

DON'T DELAY. Order your valve requirements NOW and save 25% and more! We can also make immediate shipment of reconditioned flanges—ells—tees—and other fittings at savings of from 25% to 40%. Order TODAY.

Brown-Strauss Corporation
1446 Guinotte . . . Kansas City, Mo.

For Sale—Equipment

FOR SALE: Star Mfg. Company, portable cooling tower, telescoping type, 7' wide, 13' long, 8' high. All steel. Melton Machinery & Supply Co., Seminole, Okla.

FOR SALE: At Oil Hill, Kansas; 2 McCormick-Dearing steel wheel well servicing tractors with Bearcat front end winches, $200.00 each. Patridge, Cities Service Oil Company, Bartlesville, Oklahoma.

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25 K.W. and 40 K.W. Gas Engines, 220 volts, D.C. Two 100 K.W. Gas Engine-Generator Sets, 220 volts, D.C. 7x6 Ingersoll-Rand ER-1 Air Compressor. Six-inch Oster Pipe Threading Machine. Also large stock of lathes, pipe machines, milling machines, etc. Send for our list.
Terms to suit.
CINCINNATI MACHINERY & SUPPLY CO.
26 West 2nd St., Cincinnati, Ohio.

FOR SALE
1—300 h.p. filler improved gas engine, 4 cylinder, horizontal type, 4 cycle, 17½" bore, 24" stroke, 185 rpm.
1—85 h.p. Bessemer gas engine, 2 cylinder, horizontal type, 180 rpm.
Located at Iola, Kansas, and offered for immediate shipment. The William W. Newell Company, Box 477, Nashville, Tennessee.

Reconditioned, Tested and Guaranteed Gate Valves for sale. Large stock, sizes 12" to 2", flanged end and screw end, various pressures.
Stock List and Prices on Request.
THE GATE VALVE SHOP
120 Tuke Box 1936
Pampa, Texas

FOR SALE at Wewoka: 1-10 ton Athey Trusswheel wagon, Model 843, Serial J616. $150. Patridge, Cities Service Oil Co., Bartlesville, Okla.

FOR SALE: 14" Groove V Belt Pulley.
525 Waggoner Building
Wichita Falls, Texas.

FOR SALE: Four 125-HP, 250# working pressure boilers. Oilfield type; also one 7" R. B. Union Tool unitized draw works, good condition, almost same as new. Inquire, T. T. Eason & Company, Enid, Okla.

3—150-HP 150# Working Pressure horizontal Return Tubular Boilers with breeching, in good condition; also unusually good stock of three, four and six inch valves and fittings for refinery and pipe line service. Call or write Eason Oil Co., Enid, Okla.

BUY AND SELL

Used Engines, Compressors, Power Plants and Gasoline Plant Equipment.

We Rebuild and Guarantee

L. F. SMITH CO.

217 W. Archer, Tulsa, Okla.

FOR SALE
1—5½ Keystone-Joplin Special, Waukeshaw motor, A #1 shape with string of tools including light plant. Answer Box B-174, The Oil and Gas Journal, Tulsa, Okla.

COMPRESSOR CYLINDERS

2—18 x 20 Type S Clark
1—17 x 20 Type S Clark
1—16 x 20 V.H. Bessemer
1—15 x 20 V.H. Bessemer
1—7½ x 20 — 750# W.P. Bessemer
1—8½ x 20 Worthington
1—15 x 20 Worthington
3—16 x 20 Ingersoll-Rand.
All above reconditioned and ready for work.
W. S. SMITH, 523 Thompson Bldg.
Tulsa, Okla. Phone 2-5473

Incorporation

DELAWARE CHARTERS: Complete service $35. Submitted forms. Chas. G. Guyer, Inc., Wilmington, Delaware.

Journalisms:

THE dangers of following the journalistic path are increasing as more men interested in reading our weekly efforts join the armed forces. Perhaps it is military exactitude, but at any rate a few mistakes slip by this line of defense.

For example, a letter from Pfc. John P. Marsh, and Staff Sergeant Robert A. Schaaf, of the Army technical school at Amarillo, Tex., calls attention to our revision in the geography of Pennsylvania and West Virginia, which changed the boundary slightly between these states. Being loyal Pennsylvanians they singly, collectively and unanimously object to our using the upper reaches of the Ohio River as the boundary line. This happened in a map on Page 24 of the June 4 issue, which showed the Intercoastal Waterway.

'Twas a drafting slip, and one which will be corrected ere we show this section of the map again. All and sundry living in the southwest corner of Pennsylvania are assured that they should continue sending their taxes to Harrisburg, and not to Charleston.

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ANOTHER reader calls us to task for the use of the expression "Petro-Chemistry" as an abbreviation for petroleum chemistry. This reader politely reminds us that petro-chemistry means rock chemistry because the word petroleum means rock-oil. "Undoubtedly," he admits, "petro-chemistry is an apt expression and may already be widely used, but it is all wrong if it is used in place of petroleum chemistry." He then goes on to suggest that "oleo-chemistry" is more logical as an expression because the activity will be concerned with -oleum, but that expression, in his own words, is a rather horrible idea at that. "Maybe you can work it out," he concludes, "but it seems to me that scientists who are engaged in oil chemistry should not be most unscientifically called rock chemists."

No doubt you have a point there, Mr. Keays, in regard to the derivation of the word "petroleum" and its abbreviation as "petro." However, the chemical and petroleum industries seem to like the word "petro" in reference to the increasing production of chemicals from petroleum, and our guess is that it will be quite widely used.

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IT is now Capt. George Weber. George left the Journal's staff a year ago, at which time he was in charge of the Louisiana-Arkansas editorial office at Shreveport, La. Since that time he has been busy as an acting commander of an artillery battery in North Carolina. He has recently been elevated to the rank of captain.

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IT is interesting to speculate on what the first postwar automobile will be like. Year-to-year changes during normal times are seldom sharp enough to be "revolutionary," despite the advertising copy that heralds the arrival of the new models. But with production entirely stopped for a year, or two or three, depending on how long it takes to scrap the Japs and hang the Huns, just where the industry will pick up again makes experts ponder. Some pondering has already begun. and an early issue of the Journal will carry an article revealing what appears to be the picture from where we sit.

CALENDAR

July

WESTERN PETROLEUM REFINERS ASSOCIATION, technical group, Randolph Hotel, El Dorado, Ark., July 10.

PETROLEUM INDUSTRY WAR COUNCIL, monthly meeting, Washington, D. C., July 14.

SHAWNEE GEOLOGICAL SOCIETY, "get acquainted session," Shawnee Country Club, Shawnee, Okla., July 17.

September

NATIONAL PETROLEUM ASSOCIATION, annual meeting, Hotel Traymore, Atlantic City, N. J., September 16-18.

October

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, regional meeting, St. Louis, Mo., October 2.

NATIONAL SAFETY CONGRESS and EXPOSITION, Stevens Hotel, Chicago, October 5-9.

TEXAS MID-CONTINENT OIL AND GAS ASSOCIATION, twenty-third annual meeting, Dallas, Tex., October 8-10.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, fall meeting, Rochester, N. Y., October 12-14.

INDIANA INDEPENDENT PETROLEUM ASSOCIATION, fall meeting, Hotel Severin, Indianapolis, Ind., October 14-15.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, Petroleum Division, Hotel Ambassador, Los Angeles, Calif., October 14-16.

NATIONAL STRIPPER WELL ASSOCIATION, annual meeting, Wichita, Kans., October 19.

INDEPENDENT PETROLEUM ASSOCIATION OF AMERICA, thirteenth annual convention, Wichita, Kans., October 20-22.

NATIONAL LUBRICATING GREASE INSTITUTE, tenth annual meeting, New Orleans, La., October 25-29.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, Petroleum Division, Austin, Tex., October 29-31.

ILLINOIS MINERAL INDUSTRIES CONFERENCE, Campus, University of Illinois, Urbana, Ill., October 30-31.

November

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, Los Angeles, Calif., November 5-6.

CALIFORNIA NATURAL GASOLINE ASSOCIATION, Los Angeles, Calif., November 6.

AMERICAN PETROLEUM INSTITUTE, twenty third annual meeting, Stevens Hotel, Chicago, Ill., November 9-13.

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS. thirty-fifth annual meeting, Netherlands Plaza Hotel, Cincinnati, Ohio, November 16-18.

AMERICAN CHEMICAL SOCIETY, national chemical exposition and national industrial chemical conference, Stevens Hotel, Chicago, Ill., November 17-21.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, annual meeting, New York, November 30-December 4.

December

PETROLEUM ACCOUNTANTS SOCIETY OF OKLAHOMA, Hotel Mayo, Tulsa, December 17.

1943

February

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, New York, February 15-18, 1943.

April

AMERICAN PETROLEUM INSTITUTE, Division of Production, Eastern district, William Penn Hotel, Pittsburgh, Pa., April 8-9, 1943.

May

PETROLEUM INDUSTRY ELECTRICAL ASSOCIATION, annual meeting, Houston, Tex., May 5-6, 1943.

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